International Civil Aviation Organization

Eight Meeting of the Communications/Navigation/Surveillance and Meteorology Sub-Group (CNS/MET SG/8) of APANPIRG

Bangkok, Thailand, 12-16 July 2004

Agenda Item 3: Aeronautical fixed Service

1) Review Report of ATN Transition Task Force

SIXTH ATN TRANSITION TASK FORCE MEETING

(Presented by the Secretariat)

SUMMARY

This paper reviews the work accomplished by the Sixth ATN Transition Task Force Meeting held in Bali Indonesia from 26 to 30 April 2004 and presents draft Decisions and Draft Conclusions developed by the meeting for review and consideration.

1. INTRODUCTION

1.1 The ATN Transition Task Force was established by APANPIRG/9 held in Bangkok from 24-28 August 1998 in its Decisions 9/16 to address ATN Transition issues and also to deal with residual AFS issues. The Task Force reports its activities to APANPIRG through the CNS/MET Sub-Group. This paper presents the work accomplished by the Sixth Meeting of the Task Force. The report of the Task Force with relevant Appendices is provided in Attachment to this report for detailed review.

2. DISCUSSION

2.1 The Sixth ATN Transition Task Force Meeting, hosted by the Directorate General of Air Communication (DGAC) Indonesia was held in Bali, Indonesia from 26 to 30 April 2004. The meeting was attended by 73 participants from Australia, Bangladesh, Brunei Darussalam, Cambodia, Hong Kong China, Fiji, Greece, India, Indonesia, Japan, Malaysia, Maldives, Mongolia, New Zealand, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, United States and two industries. The meeting formulated 2 Decisions 1 draft Decision and 9 Draft Conclusions for consideration by this meeting and APANPIRG/15 meeting.

2.2 The meeting considered 15 Information Papers and 25 Working Papers. The meeting, among others, developed 3 proposals for amendment of the CNS Part IV of the ASIA/PAC FASID and updated the ATN Documentation Tree and developed ASIA/PAC Regional ATN Implementation System Management Operational Procedures.

3. ACTION BY THE MEETING

The meeting is expected to:

a) review the report the Sixths Meeting of the Task Force provided in the Attachment;

b) review the draft Decisions and draft Conclusions developed by the meeting under relevant agenda items and formulate recommendations for consideration by APANPIRG/15.

INTERNATIONAL CIVIL AVIATION ORGANIZATION

ASIA AND PACIFIC OFFICE

REPORT OF THE

SIXTH MEETING OF AERONAUTICAL TELECOMMUNICATION NETWORK (ATN) TRANSITION TASK FORCE OF APANPIRG (ATNTTF/6)

Bali, Indonesia, 26-30 April 2004

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- AMHS;
- ATN Routers

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1. Opening of the Meeting

1.1 The Sixth Meeting of the ATN Transition Task Force of the ASIA/PAC Air Navigation Planning and Implementation Regional Group (APANPIRG) was held in Bali, Indonesia from 26 to 30 April 2004. The meeting was hosted by the Directorate General of Air Communication (DGAC), Indonesia.

1.2 The meeting was opened by Mr. Cucuk Suryo Suprajo, Director General of the Directorate of Air Communication of Indonesia. Mr. Suprajo extended a warm welcome to all the participants to Bali. He expressed his pleasure in hosting the meeting. He stated that Indonesia is implementing the CNS/ATM system in an evolutionary manner and has placed importance in implementation of ATN.

1.3 On behalf of Mr. L.B. Shah, Regional Director, ICAO Asia and Pacific Office, Mr. K.P. Rimal, Regional Officer, CNS of the ICAO Regional Office expressed gratitude and appreciation to the Director General , DGAC for hosting the meeting in Bali and for the excellent arrangement made for the meeting. He highlighted the tasks completed by the Task Force and outlined the objective of the Sixth Meeting.

1.4 Mr. Craig Head, Chairman of the Task Force, thanked the DGAC for hosting the meeting. He acknowledged the tasks undertaken by the Working Group of the Task Force and thanked all the members of the Working Group for their contributions. He also thanked AEROTHAI for hosting the ATN Seminar held in February 2004 in Thailand and appreciated the contributions made by various experts.

2. Attendance

2.1 The meeting was attended by 73 participants from Australia, Bangladesh, Brunei Darussalam, Cambodia, Hong Kong China, Fiji, Greece, India, Indonesia, Japan, Malaysia, Maldives, Mongolia, New Zealand, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, United States, and two industries. A list of participants is at Attachment 1.

3. Officers and Secretariat

3.1 Mr. Craig Head, Chairman of the Task Force, presided over the meeting.

3.2 Mr. K.P. Rimal, Regional Officer, CNS was the Secretary of the meeting who was assisted by Mr. Li Peng, Regional Officer, CNS of the ICAO Asia and Pacific Office.

4. Agenda

4.1 The Agenda adopted by the meeting was as follows:

Agenda Item 1: Report on other ICAO Working Group Activities:
- ATN Transition Task Force Ad Hoc Working Group Activities;
- ACP Working Group N

Agenda Item 2: Discussions and Review ATN Router Activities:
- Reference Document for the ATN Router Description;
- 2nd Version of the ASIA/PAC ATN IDRP Routing Policy Document;
- X.25 Study

Agenda Item 3: Discussion and Review AMHS Activities:
- Reference Document for the AMHS Description;
- Development Work on AFTN/AMHS Operating Procedures;
- Technical Document on Use of Director Services;
- MTA Routing Policy;
- AMHS Naming Registration Form;
- AMHS Routing Impact Study;
- Review of CNS-1C Table Structure

Agenda Item 4: Discussions and Review on ATN Technical Documents:
- Regional System Management Transition Guidance Document;
- ASIA/PAC ATN Performance Document;
- ATN Systems Integrity Issues

Agenda Item 5: Review Tables and Charts for the ground-to-ground part of the CNS FASID:
- AIDC;
- AMHS;
- ATN Routers

Agenda Item 6: Review ATN Implementation/Operational Activities and Issues:
- Review State's ATN Implementation Plans

Agenda Item 7: Review Status of Implementation of AFTN circuits, evaluate circuit capacity and consider timescale for transition to ATN.

Agenda Item 8: Review the Subject/Tasks List of the ATN Transition Task Force and develop future work of the Task Force.

Agenda Item 9: Any other business.

5. Organization, Working Arrangements and Language

5.1 The Task Force met as a single body. The working language was English inclusive of all documentation and this Report. Lists of Working Papers and Information Papers presented at the meeting are at Attachment 2.

6. Title and Terms of Reference of the Task Force

Title: ATN Transition Task Force

Terms of Reference:

Plan for implementation of the Aeronautical Telecommunication Network (ATN) in the ASIA/PAC region to meet performance and capacity requirements of CNS/ATM Systems. The planning also addresses the ongoing development of the AFS including digital speech communication.

Reference No.	Title	Page
DECISIONS		
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Agenda Item 1: Report on other ICAO Working Group Activities

1.1 The meeting reviewed the highlights of all the works carried out by the Working Group of the ATN Transition Task Force (ATNTTF) (formally known as the ATNTTF Ad Hoc Working Group) since the Fifth Meeting of the Task Force held in Phuket, Thailand in June 2003.

1.2 It was noted that the Working Group met twice in 2003 and one time in early 2004. The Eighth Meeting hosted by FAA and ITT was held from 7 to 9 of October 2003 in Van Nuys, CA, USA. The Ninth Meeting hosted by Aerothai was held from 17 to 18 of November 2003 in Bangkok, Thailand in conjunction with the Second Meeting of ACP Working Group - N. The Tenth Meeting was held on 2 of February 2004 in Chiang Mai, Thailand in conjunction with the ATN Seminar and was hosted by Aerothai.

1.3 During the above three meetings, the Working Group discussed a number of topics on the various documents that were to be developed. Tasks were then assigned to various experts to prepare draft of the documents. The Working Group meeting dealt with the detail discussions on the various documents that were required to be presented at the Sixth Meeting of the Task Force. The progress of development of following documents were presented to the meeting:

- Reference Material for an ATN Router Description;
- Reference Material for an ATS Message Handling System (AMHS);
- Regional System Management Guidance Document;
- 2nd version of the ASIA/PAC ATN IDRP Routing Policy Document.
- ATN Performance Document;
- Updates on development status of ATN Systems Integrity documents;
- Updates on development status of ASIA/PAC Regional ICD for AIDC;
- Updates on development status of AFTN/AMHS Operating Procedures; and
- Second Edition of Regional ATN Planning Documents;

1.4 The meeting appreciated the works conducted and progress made by the members of the Working Group in completing the tasks assigned to it by the ATNTTF and noted that there are a few more tasks that required to be completed by the Working Group in accordance with the Subject/Tasks List approved by APANPIRG for the ATNTTF. Australia, Hong Kong China, Fiji, Japan, Singapore, Thailand and USA confirmed their willingness to continue their membership and support the work of the Working Group. As SITA was not present at the meeting, it was also agreed to consult SITA to ascertain its membership of the Working Group.

ACP Working Group - N Activities

1.5 The meeting noted that four Sub-Groups were created at the First Meeting of Aeronautical Communications Panel (ACP) Working Group-N (Networking) held in Montreal 20- 23 May 2003 as follows:

- SGN1 (Internet Communication Services-ICS);
- SGN2 (air/ground applications);
- SGN3 (ground/ground applications); and
- SGN4 (security services).

1.6 The meeting reviewed the activities conducted by ACP Working Group - N (WGN) and its four Sub-Groups. The Second Meeting of the ACP Working Group - N (WGN/02) was held in Bangkok, Thailand 14-21 November 2003. The First Meeting of Sub-Group of WGN was held in conjunction with ACP WGN/02. The Third Meeting of ACP Working Group - N (WGN/03) will be held in Montreal from 19 to 28 May 2004.

Internet Protocol (IP) Sub-Network Dependence Conversion Function (SNDCF)

1.6.1 The First Meeting of SGN1 reviewed its tasks and outstanding work items inherited from ATN Panel's Sub-Group B and identified its future work. It was noted that the final text for the technical provisions and guidance material on sub-network dependence conversion function (SNDCF) for the ATN ICS that will allow Internet Protocol (IP) networks to be used as ATN sub-networks for relaying ISO/IEC 8473 Connectionless Network Protocol (CLNP) Protocol Data Units (PDUs) has been completed for inclusion in ICAO Doc. 9705 and Doc. 9739 respectively. It will allow ATN devices to communicate over IP networks as well as ISO/IEC8208 (X.25) circuits or packet-switched networks. An outstanding work item on this is to develop mappings between CLNP and IP priority levels. It was noted that that WGN would perform a final review of the proposed IP SNDCF technical provisions and guidance material at its Third Meeting in May 2004.

Technical Provisions Relating to the Use of TCP/IP Protocols in Aeronautical Internetworking

1.6.2 SGN1 has been tasked to investigate the feasibility of the direct use of the IP protocol suite by aeronautical applications; that is, without using the ATN ICS. SGN1 is carrying out an investigation to determine whether TCP/IP should be used directly, by what applications and in what circumstances. Experts were requested to submit Working Papers to the SGN1/2 Meeting to be held in May 2004 indicating the positions of their nominating States and Organizations.

1.7 SGN2, at its First Meeting, reviewed its Terms of Reference given to it by ACP WGN, and tasks to be completed. Since technical and guidance material for ATN air/ground applications had been completed, SGN2 was largely concerned with tidying up maintenance related materials, and monitoring new and revised operational requirements emerging from operational bodies such as the OPLINK Panel.

1.8 SGN3, at its First Meeting, agreed with the proposed changes to the specification of the CIDIN/AMHS Gateway which had been added to the ATSMHS documentation as part of Doc. 9705, Edition 3, and likewise as part of Doc. 9739, Edition 2. It was further agreed to submit these for endorsement to WGN. The SGN3 also confirmed the ATSMHS terminology in singular to read as "ATS Message Handling Service" and the terminology AMHS to stand for "ATS Message Handling System". SGN3 identified that "Minimum Global Implementation Profiles" should be defined for deploying AMHS by States. A recommendation for the minimum global profile "Basic Service and Directory" was endorsed by SGN3. The issue of Global Co-ordination for AMHS implementation was also discussed by the SGN3.

1.9 SGN4, at its First Meeting, discussed the following Work Program Status including PDRs against Doc. 9705 Edition 3; ATN and IPsec issue; VDL-3 Sub-network Security; AIDC Security Provisions and Draft ATN System Integrity Policy which was derived from ASIA/PAC System Integrity Policy. It was noted that such a Policy was expressed at the Eleventh Air Navigation Conference. Experts from member States were invited to report on individual policies with consolidated view to be reported to the AC Panel Secretary.

Agenda Item 2: Discussions and Review ATN Router Activities

2.1 Under this Agenda Item, the meeting discussed several issues based on several working papers presented on the development status of materials regarding ATN Router Activities including result of X.25 study.

Reference Document for the ATN Router Description

2.2 The meeting reviewed a draft reference document presented by USA on description for the ASIA/PAC regional ATN ground-ground router. The document was prepared to provide description of the ground-ground router related protocols, performance, network management and security requirement.

2.2.1 The document was developed in accordance with Decision 5/2 of Fifth ATNTTF Meeting based on the outline of the document presented to that meeting. It was considered that such material would help better understanding the requirements of the specification for an ATN router. It was agreed that document should be used as a reference document to facilitate implementation of ATN infrastructure in the region.

2.2.2 Considering the document is advisory in nature, it was agreed to change those mandatory statements such as “shall” in the text into advisory statements “should” etc. In order to keep consistence with available technical specification and recommend practice specified in the ICAO Documents, some contents were suggested to be removed from the draft document and references should be made to relevant paragraphs of the published technical specifications. However, for easy reference to its reader, necessary duplicated statements may be kept.

2.2.3 In light of foregoing discussions, the meeting adopted the revised ASIA/PAC Regional Aeronautical Telecommunication Network (ATN) Ground-Ground Router Description document provided in Appendix A.

Second Version of the ASIA/PAC ATN IDRP Routing Policy Document

2.3 The meeting reviewed the draft of the Second Version of ASIA/PAC ATN IDRP Routing Policy presented by USA. The first release of the Document was approved by Fourteenth Meeting of APANPIRG under its Conclusion 14/14. The policy requirements and recommendations specified in the ASIA/PAC ATN IDRP Routing Policy are derived from the general routing policy goal of providing global shortest path connectivity with a minimal exchange of routing information. The Routing Policy has explicit requirements for backbone routers as well as a number of recommendations for non-backbone routers for the ground/ground element of ATN.

2.3.1 Japan presented a working paper providing comments regarding a recommendation associated with the policy statement on route preference policy for inter-regional aggregate routes i.e. that certain routers should only accept inter-regional aggregate routes on these connections. As result of discussion, the meeting agreed to remove this recommendation as it would not be implemented by a generic Class 4 router at the initial implementation stage.

2.3.2 It was further stated by Japan that in principle, to the greatest extent possible regional standards and recommendations that affect equipment specifications should avoid being unnecessarily restrictive as this would limit the number of commercial off-the-shelf (COTS) products from which States and Organizations may choose, and would impose costs on States and Organizations that have already acquired equipment and need to upgrade to ensure compliance. It was recognized that deployment of the regional ATN backbone network had only just begun. It was recommended to monitor the usage of the regional ATN backbone and emerging requirements, and to conduct reviews of regional policies as necessary based on revised and new operational requirements that may emerge.

2.3.3 Considering no substantial changes other than examples having been made in the draft second version of the document when compared to its first release, the meeting considered it appropriate for the changes agreed above to be released as the Second Version of the ASIA/PAC ATN IDRP Routing Policy and for it to be made available on the ICAO APAC website.

X.25 Study

2.4 USA presented a paper on the draft version of ICD for ISO 8208 (X.25) protocol requirements list (PRL). It was recommended that X.25 requirements in the ATN ground-ground router ICD be moved to a separate ICD and properly specified a PRL, i.e. in Protocol Implementation Conformance statement PICs, format. It was stated that this would leave the Router ICD independent of sub-networks and allow for the introduction of new sub-networks. As this is one of the three new ICDs indicated in the proposed changes to the ATN Document Tree and also relevant changes may be required to be made to the ATN ground-ground Router ICD, the meeting referred this paper to the Working Group for further study and comments.

2.5 Rapporteur of the Working Group presented a paper on result of its study on the longevity of the supply of vendor provided products that supports X.25. The Working Group was tasked to investigate the impact of X.25 capability to determine availability of X.25 subnet technology at the ATNTTF/5 Meeting in Phuket in 2003.

2.5.1 It was observed that the regional ATN network is not dependent on X.25 packet switched networks, but will be a private network composed of point-to-point communication links between ATN routers, which implement the necessary data relay functionality. In most cases, the communication links will be “clear channel” links, and the only X.25 equipment required are the X.25 cards and software built into the ATN routers. A Digital Service Unit or Network Terminating Unit will interface the router to the circuit.

2.5.2 It was also noted that point-to-point X.25 links may be supported on top of other sub-networks, such as X.25 over TCP/IP, X.25 over Frame Relay, and X.25 over ISDN (Integrated Services Digital Network), allowing the use of X.25 where direct support for these sub-networks is not built into the ATN router. The data channels of ISDN use the X.25 protocol and suitable Terminal Adapter (TA) allow X.25 DTEs to connect directly to ISDN circuits. Cisco Systems routers implement the XOT protocol which allows transmission of X.25 packets over TCP/IP.

2.5.3 It is anticipated that X.25 boards will be readily available for at least the next five years, and after that probably at increasing cost and diminishing availability. This will serve adequately to allow the regional ATN network to be established and to operate in the short-to-medium term (5 to 10 years).

2.5.4 The incorporation of the IP SNDCF into SARPs is anticipated, but is expected to take at least a further year; after this, there can be a delay from formal publication in Technical Specifications until the availability of such functionality in commercial (rather than experimental) ATN routers. The IP SNDCF should allow the replacement of point-to-point X.25 connections in the ATN ground network with IP connections in the medium-to-long term. However, there will be some issues to be determined, such as which version of IP to be preferred (IPv4 or IPv6), what measures should be taken for sub-network security, etc. would have to be addressed.

2.5.5 Sub-networks such as Frame Relay may be supported either if directly supported by the ATN routers which implement the appropriate sub-network dependent convergence function (SNDCF) or by using X.25 with commercially available encapsulation technologies.

Review of X.25 Board and Switch Suppliers

2.5.6 The following summary of the main comments were received from a X.25 board manufacturer:

- Globally the use of X.25 is shrinking with the growth of IP, the X.25 board business is growing. This is suspected to be due to business shifting from larger vendors, who are withdrawing from the X.25 market due to its lower profitability, to smaller vendors. This growth is expected to continue for the next four years.

- Investment in X.25 products by the vendor is continuing; X.25 cards are being updated to remain compatible with the latest bus standards, and there is a stated intention to support newer emerging bus standards when they enter the mainstream.

- Revenue model-based organizations in the private sector currently make up the majority of organizations who are shedding their X.25 infrastructure in favour of IP, and in the case of these larger organizations a gradual transition from X.25 to IP has been taking place using protocol conversion. However, SITA and Siemens in Europe have both elected to re-invest in their X.25 infrastructure, and the FAA, US Army and US Air Force are continuing to deploy X.25 equipment.

2.5.7 In general, most X.25 switch suppliers will be phasing their X.25 products out over the next several years due to the increase in IP products and high speed services that are now available on the market. Companies such as Enterasys have advised they have dropped support for X.25 on their products. Cisco Systems, which is not an X.25 Switch supplier, has stated in a document on its web site that it will still maintain support for X.25 on its routers in response to market requirements.

2.5.8 The ATN protocol stack uses CLNP as the network protocol and allows different sub-networks to be used for CLNP relay through the SNDCF protocol sub-layer. For ground-ground communications, an SNDCF for X.25 (ISO/IEC 8202) is specified explicitly in the ATN SARPs (section 5.7.5) and is generally assumed to be a “standard” ATN sub-network along with Ethernet, and there is also provision for (although not specification of) SNDCFs for Frame Relay and ISDN.

2.5.9 In anticipation of the growth of IP communications, the internet communications sub-group of the former ATN Panel Working Group produced a draft SNDCF for IP that allows the use of IP networks as a sub-network for ATN communications: that is, it allows IP sub-networks to be used to carry CLNP packets between ATN systems. This is expected to be reviewed at the Third Meeting of ACP Working Group N, which will be held in Montreal in May 2004, and if approved by the Working Group, is expected to be forwarded to the ACP/1 Meeting (anticipated in 2005) for review and further action. However, the timing of publication whether it will be added as an amendment to the current Edition 3 or will appear in a later Edition 4, is unknown.

2.5.10 Based on result of study, it was concluded that in the short-to-medium term (5 to 10 Years) that X.25 will be suitable to be used in the region for at least the next five years. It was recommended that suitable spares should be acquired if the service is to operate over a longer period of time. Acquisition of sufficient spares for a 10 to 15 years service life is recommended. In the medium to long-term, it is recommended that ATN equipment is able to be upgraded to interconnect by using IP when the ATN SARPs have been developed and are mature enough to be implemented. Accordingly, the meeting formulated the following Draft Conclusion:

Draft Conclusion 6/1 - Use of X.25 protocol

That, States continue using X.25 as recommended protocol to support implementation of ATN ground infrastructure in the short to medium term (5-10 years) and consider acquisition of sufficient spares for the service life of the equipment.

Agenda Item 3: Discussion and Review AMHS Activities

3.1 Under this Agenda Item, the meeting discussed various AMHS related issues including the review of the structure of Table CNS-1C AMHS Implementation Plan.

AMHS related activities in Europe Region

3.2 The meeting appreciated a visual presentation made by the representative of AFS Group in ICAO European region, who is from Hellenic Civil Aviation Authority, on ATN/AMHS planning and implementation status in the European region. The presentation also covered various aspects of aeronautical communications in European region including planning bodies, contributing organizations and their functions as well as relevant programme being under taken. The meeting was informed that applications of air/ground data communications would be supported by VDL Mode-2 and on ATN compliant ground sub-network. The EUR AMHS Manual is being developed by AFSG, Planning Group in order to provide regional guidance for AMHS implementation. The regional and transitional issue will be addressed in the Manual. Following the European region's decision to use TCP/IP for the initial implementation of AMHS, trials are being conducted over TCP/IP network with very successful results to-date. The AMHS at designated interregional entry/exit points in the European region would be equipped with dual stacks and responsible for conversion to/from ICAO ATN technical standard compliant TP4/CLNP.

Reference Document for AMHS Description

3.3 The meeting reviewed the ASIA/PAC ATN AMHS Description Document presented by USA. The document provides description of AMHS functionality, system performance, information security requirements and system management requirements. The document was prepared to provide details of various features of AMHS. The meeting identified the need for further refinement of the document and present it for review by the ATN Transition Task Force Working Group. As the document was intended to be use as a reference document to facilitate implementation of AMHS in the region, it was agreed to seek endorsement of the Task Force members through electronic means as a fast track approach and subsequently circulate the document to all the members for immediate use. Accordingly, the meeting reached the following Decision:

Decision 6/2 – Finalization of Reference Document for AMHS Description

That,

1) The expert from USA complete and submit the Reference Document for AMHS Description to the Working Group Meeting; and

2) The Working Group finalize the document and make available to the Secretariat for further action.

AMHS Addressing Schemes and PRMD - Name Value

3.4 The Secretariat presented a paper prepared by Japan regarding a summary of the information provided by States in reply to State Letter SP 54/1 – 03/39 sent to States by ICAO Secretary General in May 2003 concerning the establishment of an ICAO register for AMHS addressing scheme and PRMD-name value. In order to facilitate the orderly, systematic and worldwide implementation of the AMHS, which is to replace ageing AFTN and CIDIN, ICAO is in the process of establishing registers for management domains (MDs) and addressing schemes. It was informed that 55 responses were received by the ICAO Secretariat from 54 States and Organizations including 9 States from ASIA/PAC region.

3.4.1 Registration of PRMD-name value and selection of AMHS addressing schemes are important process for establishing ATS Message Handling Service. The meeting was informed that the Second Edition of ASIA/PAC ATS Message Handling System (AMHS) Naming Plan developed by the ATNTTF as part of ASIA/PAC Regional Aeronautical Telecommunication Network (ATN) Planning Document was issued in March 2004. States in the ASIA/PAC region are encouraged to use it as guidance for selection of their AMHS addressing schemes and registration of PRMD-name value.

3.4.2 The meeting noted that a default value based on the Nationality Letters defined for each State in ICAO Doc. 7910 has been reserved for each State in the Draft ICAO Register of AMHS MDs. It was further noted that although in the pro-forma the addressing scheme CAAS was recommended, the addressing scheme XF as the default value was assigned in case of no reply by the States had been received by 14 October 2003. It was informed that United Kingdom had decided to use the XF addressing scheme and the correspondent table entry would be amended.

3.4.3 It was informed that information provided in the summary will be subject to changes in the future as additional States may provide AMHS MD and addressing information for registration and States having declared use of XF addressing scheme may decide to migrate to CAAS when the transition period is over. It was noted that ACP Working Group-N is expected to develop an appropriate set of procedures for the management, update and publication of this Register information.

MTA Routing Policy

3.5 Japan presented a working paper on the MTA Routing Policy. The following two methods were proposed for the initial stage of ATN transition where some AFTN links are replaced by ATN/AMHS.

- Method 1: “Routing by relaying through adjacent AMHS sites based on the current AFTN routing directory”; and

- Method 2: “Direct MTA-to-MTA routing between States that have introduced AMHS based on the current AFTN routing directory”.

3.5.1 It was emphasized that during the initial stage of transition when AFTN and ATN/AMHS operate together, the highest priority for consideration by States is no negative impact on the existing AFTN operations of other States. It was proposed that AMHS routing based on the current AFTN routing, which would thus have less impact on the current AFTN routing. Therefore, Japan basically proposes AMHS routing method 1, but method 2 is also possible if the necessary connection tests are carried out and necessary changes are made to the AFTN routing directory.

3.5.2 Incremental implementation of AMHS routing was recommended with the following stages:

(1) The initial stage of ATN/AMHS transition;

(2) The “backbone complete” stage in which some progress has been made towards ATN transition (ATN links are established between backbone sites, and AMHS systems are operational at those sites); and

(3) The final stage, when most of the ASIA/PAC States have transitioned to ATN/AMHS.

3.5.3 The meeting also noted the comparison of methods 1 and 2 provided by Japan. It was also noted that the advantage and disadvantage of each method. The meeting agreed to the proposed description of three stages of incremental implementation. It was also recognized that for the initial stage of transition, the implementation of ATN/AMHS would be smooth, if the first method is taken.

AMHS Routing Impact Study

3.6 Hong Kong, China conducted a study for alternate routing for traffic to/from USA by an interim direct ATN link to be established between Hong Kong, China and USA. The circuit would be served as an alternate routing for the Japan-USA ATN link to facilitate the regional migration towards ATN/AMHS operations. The benefits were, firstly, that this could avoid the need to introduce expensive interim measures to modify software or intensive manual intervention to re-route AMHS messages via AFTN. Secondly, the additional Hong Kong, China-USA link would enhance the robustness and resilience of the ATN Network between NAM and ASIA/PAC regions. It was recommended that the link be implemented on a trial basis to increase redundancy and to mitigate the impact of ATN link failures on the AFTN, and the need for the circuit would subsequently be reviewed based on the progress of ATN implementation in the region.

3.6.1 Furthermore AFTN/AMHS Routing Impact was conducted on the effect of the interim Hong Kong, China-USA link on current AFTN routing basing on the 25th Edition ASIA/PAC AFTN Routing Directory (issued in January 2004). The conclusion was that the introduction of the interim Hong Kong, China-USA ATN link will not cause any change to the existing AFTN routing. As the backbone ATN links will operate on 64Kbps, there is serious concern on the capacity of some segments of the existing alternate AFTN link when the Japan-USA ATN link fails. It is considered that message delay is inevitable and could be very serious when alternate AFTN link is used. The additional interim link between Hong Kong, China and USA would further offer an advantage by enhancing the IDRP dynamic routing between Hong Kong, China, Japan and USA by forming a simple triangular topology connecting the three centers.

3.6.2 It was informed that to gain early operational experience and reap full benefits of ATN/AMHS implementation, including the interim back up ATN link, Hong Kong, China has coordinated with the USA to carry out an AMHS trial in July this year.

3.6.3 USA informed the meeting that the AMHS trial to be conducted will be for compatibility testing. An arrangement for a similar parallel testing is also being made between China and USA to see how best the aeronautical data traffic can be exchanged between the two States. The result of the testing will be considered for further action.

3.6.4 In light of above discussion, it was concluded that the compatible trials will have no operational impact to the existing traffic. The result of testing should be further analysed. Based on the result of trials, necessary changes to the ATN implementation plan may be considered.

3.6.5 Japan presented a working paper and reported the AMHS Routing Impact Study on the proposal made by Hong Kong, China. Various impacts caused by the proposal were reported in the working paper.

Review of Table CNS -1C – AMHS Implementation Plan Structure

3.7 The Rapporteur of the Working Group made a presentation on a revised structure of FASID Table CNS-1C. At its Fifth Meeting of the ATNTTF, the Task Force discussed the structure of the Table CNS-1C used to tabulate information on the planning of AMHS implementation in the ASIA/PAC region. The meeting in its discussions on the Table concluded that the Table should be reworked to make it clearer to the reader in what it was trying to portray. In doing so the Task Force assigned the task to its Working Group to undertake a review of the Table.

3.7.1 The ATNTTF Working Group at its Eighth Meeting reviewed the Table and reworked the Table's structure so that it was more appropriate in describing its contents as part of the FASID for the ATS Message Handling Service (ATSMHS) Implementation Plan. The Working Group after some deliberations and further refinement at its subsequent meetings decided that the Table structure would best be served reflecting all the required information.

3.7.2 The meeting reviewed and agreed to the revised table structure. The contents of the Table for requirement for AIDC for each States was provided under Agenda Item 5.

AMHS Naming Registration Form

3.8 The meeting reviewed the AMHS Naming Registration Form presented by the Rapporteur of the Working Group. It was considered necessary to develop an AMHS Naming Registration Form for registration of essential information of NSAP address of each AMHS and contact point for coordination. As result of review, the meeting agreed to the proposed structure of the registration forms as provided in the Appendix B to this report for adoption. It was also agreed that Hong Kong, China, Japan and USA would use the forms for trial and report back to the ATN Transition Task Force of any difficulties and deficiencies in their use. The registration form will be used for registration of AMHS Names within the Region. These forms will form the basis for documenting States' AMHS naming conventions and selected AMHS names for ATN communications within the ASIA/PAC region. Accordingly, the meeting formulated the following Draft Conclusion:

Draft Conclusion 6/3 – AMHS Naming Registration Form

That, the AMHS Naming Registration Form provided in Appendix B be adopted and circulated to States.

3.9 The Working Group of the Task Force was tasked to develop a procedure for registration.

Technical Document on Use of Directory Services

3.10 USA presented a paper prepared by Thailand and USA on a draft document relating to the application of the ATN Directory Service in the ASIA/PAC region. The introduction of the ATN applications, especially AMHS, changes the way that information is exchanged within Administrations as well as between States. It was recognized that the need for the exchange of information could best be provided through the definition of a directory service. It was informed that the definition of the directory services was completed and published as Sub-Volume 7 of Doc. 9705, Edition 3. The draft document presents information on the planning of implementation of the ATN Directory Services (ATN-DS) within the ASIA/PAC region.

3.10.1 The document was considered containing comprehensive information. The members of the Task Force were requested to provide their comments on the draft document to the Chairman of the ATN Transition Task Force by email by the end of June then the Chairman of the Task Force will pass it to Working Group of the Task Force to finalize it. The document then will be ready for adoption at the next Task Force meeting.

AMHS over TCP/IP

3.11 The meeting recalled that at the Fifth Meeting of the Task Force held in 2003, it was recommended that if administrations within the ASIA/PAC region wish to pursue the implementation of the TCP/IP subnet as part of the ATN, they should be able to do so through bilateral agreements on the understanding that they may be required to make changes to their subnets if and when the TCP/IP subnet is developed as part of the ATN SARPs.

3.12 In view of the foregoing and also considering the action taken in the EUR region to use TCP/IP protocol for initial implementation of AMHS as a transition mechanism to enable AMHS operations to commence ahead of the eventual SARPs compliant data transmission system as an interim local solution the meeting further endorsed the recommendation of its Fifth Meeting and formulated the following draft Conclusion:

Draft Conclusion 6/4 - Use of AMHS over TCP/IP in the ASIA/PAC region

That, Administrations within the ASIA/PAC region willing to pursue the implementation of the TCP/IP subnet as part of ATN they may do so on a bilateral basis on the understanding that they may be required to make changes to their subnet if and when the TCP/IP is developed as a part of the ATN SARPS.

Agenda Item 4: Discussions and Review on ATN Technical Documents

4.1 A number of working papers were presented under this Agenda Item. The main topics included material on system management guidance document, ATN performance documents and system integrity issues.

ATN Document Tree

4.2 The meeting reviewed the proposed changes to the ATN Documentation Tree presented by USA. It was noted the Second Edition of this document was finalized by the Fifth Meeting the Task Force and it was adopted by APANPIRG under its Conclusion 14/13. The document was required to be updated to reflect new planning documents developed by the Task Force and to provide an index and hierarchy on relevant ATN documents that are available to assist States in their ATN planning and implementation programmes. The meeting agreed that this document would be of value and recommended that this document, shown in Appendix C be considered as a Third Edition and proposed to make it available on the ICAO website. Considering that the ATN Document Tree is a rolling document serving as index to other related planning and technical document will not need approval by APANPIRG. The paper also indicated a trend for the next edition of the document as information to the meeting.

ASIA/PAC ATN Performance Document

4.3 Japan presented a paper on the third version of ATN Performance Document. It was recalled that the ATN Transition Task Force (ATNTTF) has been assigned a number of tasks to assist States for the implementation of ATN. One of the specific action items was to develop documentation on the ATN Performance. The document provides the technical guidance related to the ATN performance. The information on the definition of performance, especially RCP and planning as well as the monitoring of ATN performance was provided.

4.3.1 It was noted the first version of the Document was presented at the Fourth Meeting of the Task Force and the second version was presented to the Fifth Meeting of the Task Force in which the air-ground Performance Samples had been removed and Performance Monitor Parameters had been added. The concept of required communication performance is based on the analogy of the concept of required navigation performance. In the current version, Ground to Ground Performance Monitor Parameters had been added.

4.3.2 The meeting appreciated for the continuous efforts made by the expert from Japan in this regard. However, considering that the RCP requirements as described in the document are for air-ground communication and there was a need for input by ATM experts. The meeting, therefore, noted further that works relating RCP was being addressed by OPLINK Panel and RCP Manual is being developed. In view of the task under taken by OPLINK in this regard and to avoid duplication, the expert from Japan was requested to refer the ATN Performance Document to OPLINK Panel for comment and provide the resulting comment to the next Task Force Meeting.

Status on the Regional ICD for AIDC

4.4 Thailand updated the status on the development of ASIA/PAC regional interface control document (ICD) for ATN Inter-facility Data Communication (AIDC) which was being developed by Thailand.

4.4.1 The ICD is being prepared in line with technical description specified in Third Edition of ATN SARPs (Doc. 9705) and Second Edition of Comprehensive ATN Manual (Doc. 9739). It was also required to take note of the result of work under taken by OPLINK Panel in this regard. Additionally, some information continued in the existing AFTN based interface control document for AIDC system (Version 2.0) has also been taken into account as part of the ATN AIDC ICD. ICD will be completed before 2005 within the timeframe set in the Subject/Tasks List for the ATN Transition

Task Force and will be processed through the Working Group meeting to the next meeting of the Task Force to be held in 2005.

System Management Policy

4.5 USA provided an update on the development of the initial draft on system management policy. The document prescribed the system management policy and associated requirements applicable to the Aeronautical Telecommunications Network (ATN). It applies to ATN implementations and defines the rules governing the management of ATN data, services and resources associated with ATN applications and processes. The design, implementation and operation of the ATN must support the complete and consistent enforcement of a system management policy. It was estimated that the draft document will be ready for view by the Working Group and then ready for consideration by the next Task Force meeting of the Task Force.

ASIA/PAC Regional ATN Implementation System Management Operational Procedures

4.6 The meeting reviewed a draft Document presented by USA on the system management for transition guidance. The document is intended to provide initial direction and guidance in the identification, development, and selection of ATN administrative management tools, agreements and documents necessary to facilitate and continue operation required for transition from current systems to the ATN. The document also provides samples for service level agreements and Technical Memorandum of Cooperation.

4.6.1 As result of review, the meeting agreed to endorse it for adoption with necessary refinements made during the meeting. Accordingly, the meeting developed the following Draft Conclusion:

Draft Conclusion 6/5 – ASIA/PAC Regional ATN Implementation System Management Operational Procedures

That, the ASIA/PAC Regional ATN Implementation System Management Operational Procedures provided in Appendix D be adopted and circulated to States to assist in implementation of the ATN ground infrastructure in the ASIA/PAC region.

ATN Systems Integrity Issues

4.7 USA presented papers on the ATN Systems integrity and self-assessment and verification checklist as well as sample of the Designated Approval Authority (DAA) in each administration to authorize operation of the systems in the administration's domain. The authorization is to be based on a review of the management, operational, and technical controls of the systems. The presented checklist, taken from the US National Institute of Standards Publication, "Security Self Assessment Guide for IT Systems (NIST SP 800-26)" might be used as a suitable verification checklist. The complete document is available at http://csrc.nist.gov/publications/nistpubs/.

4.7.1 The meeting appreciated the examples provided for consideration by Task Force members. However, considering that ATN implementation in the region is just in the initial stage, it was agreed that security consideration is one of basic requirement in planning for ATN. Therefore, the meeting agreed to refer these samples of checklist and Designated Approval Authority (DAA) to the Working Group for further study and comments. In view of the foregoing, the meeting formulated the following Decision:

Decision 6/6 – System Integrity Verification Check List

That, the Working Group review and revise the checklist applicable to AMHS implementation and determine suitability of the system Authorization Verification and certificate for use in the ASIA/PAC region.

Agenda Item 5: Review Tables and Charts for the ground-to-ground part of the CNS FASID

Table CNS-1D - ATS Inter-facility Data Communication (AIDC)

5.1 With a view to improve the format and presentation of requirements in the existing sample Table CNS-1D provided in ASIA/PAC FASID, Part IV CNS, a suggested format was proposed by Thailand. The proposed format would provide understanding of the information presented thereon. The proposed format was reviewed and adopted with slight modification of description for column 4 to allow AIDC over AMHS where operationally required and considered practical and cost effective during initial implementation.

5.2 During the discussion, it was noted that there were three options available for implementation as follows:

1) Existing AIDC over AFTN;
2) Existing AIDC over AFTN/AMHS; and
3) Fully ATN compliant AIDC

5.3 In an information paper presented by Japan, it was suggested that the AFTN based AIDC should be implemented using a multiplexing technique sharing the single communication line for both AFTN/AMHS gateway and AIDC rather than establishing a link through AFTN/ATN gateway and router. If AFTN based AIDC is implemented through AFTN/ATN gateway, it will have adverse impact on the efficiency of AIDC communication in terms of reliability and response time required for AIDC communication.

5.4 The meeting taking note of the foregoing reviewed and adopted Table CNS-1D and requested ICAO to provide the Table to the ATM/AIS/SAR SG to review the Table and also to identify requirements for AIDC where applicable and then circulate to States to complete details and provide result to the next meeting of the Task Force. The meeting formulated the following Draft Conclusion:

Draft Conclusion 6/7 – Table CNS-1D - AIDC

That,

a) ICAO be requested to co-ordinate the format of the Table CNS-1D provided in Appendix E with the ATM/AIS/SAR Sub-Group of APANPIRG and identify requirements for AIDC as far as possible;
b) circulate the Table to States for review and comments; and
c) provide results of the consultations to the next meeting of the Task Force.

ATS Message Handling System (ATSMHS)

5.5 The meeting reviewed the Table CNS-1C – ATSMHS Plan and made changes as required and finalize the Table. It was agreed that the existing sample Table CNS-1C provided in ASIA/PAC FASID, Part IV CNS, should be replaced with Table provided in Appendix F.

In view of the foregoing, the meeting formulated the following Draft Conclusion:

Draft Conclusion 6/8 – Amendment Table CNS-1C – ATSMHS Implementation Plan

That, the sample Table CNS-1C – ATSMHS Implementation Plan provided in ASIA/PAC FASID, Part IV CNS be replaced with the Table CNS-1C shown in Appendix F

through the established procedure.

ATN Router Plan

5.6 The meeting noted that Table CNS-1B-ATN Router Plan had already been reflected in the ASIA/PAC FASID. The meeting reviewed various requirements and target date of implementation of recommended facilities contained in the plan. The meeting proposed changes to the Router Plan recommended for Apia, Samoa to be directly connected to New Zealand and amended the name of Router Location in USA from Oakland to Salt Lake City, identified various intra-domain links and updated the target dates. The meeting agreed that the existing Table CNS-1B should be replaced with an updated Table provided in Appendix G and formulated the following Draft Conclusion.

Draft Conclusion 6/9 – Amendment to Table CNS-1B – ATN Router Plan

That, the existing Table CNS-1B provided in ASIA/PAC FASID, Part IV CNS be replaced with an updated Table contained in Appendix G

EUR Basic Air Navigation Plan and FASID Amendment

5.7 An information paper was presented by member of the EUR AFSG from Greece regarding a proposal for amendment of Basic EUR Air Navigation Plan (ANP). It was noted that the EUR AFSG/PG reviews the ANP materials relating to aeronautical communication and develops amendment to the Basic EUR ANP and EUR FASID. It was noted that amendment of FASID would take place when sufficient AMHS transition and implementation activities would be underway. EUR/NAT/COM Chart depicting AFTN/CIDIN connectivity was provided although the information contained therein was being updated. It was further noted that EUR AFSG will continue drafting material for the EUR ANP, which will mainly reflect on-going developments concerning AMHS implementation in the EUR region. The meeting also noted the contents of the approved amendment of Basic Air Navigation Plan - EUR Region (EUR/NAT 00/35-CNS).

Agenda Item 6: Review ATN Implementation/Operational Activities and Issues

6.1 Under this Agenda Item, presentations were made by States and an industry on their ATN implementation activities.

6.2 It was noted that Japan Civil Aviation Bureau (JCAB) has commissioned AFTN/AMHS Gateway and ATN Router and has carried out AFTN/AMHS technical and pre-operational trials with the United States. Japan and the United States will commission AMHS using 64 Kpbs ATN link on 10 May 2004. Subsequently, the AMHS will be used to carry AFTN messages between Japan and the United States.

6.3 It was also noted that Australia is replacing its AFTN switch which is providing three different kind of data communication services such as AFTN, OPMET Data Bank and AIS services. It is expected to award contract for the supply of AMHS by December 2004. The AMHS will be implemented by 2005 or early 2006.

6.4 The meeting noted Mongolia's communication infrastructure development programme and various phases of implementation of facilities. The ground-to-ground communication within Mongolia utilize VSAT link using X.25 and frame relay. VSAT link is used for AFS communication with China and a fiber optic cable used to support AFS communication with the Russian Federation. The fiber optic system will be upgraded to high speed and high capacity link by the end of 2004. The existing system and network will be progressively upgraded by 2006 and the facilities will also be implemented in different phases during the period 2005-2010. Mongolia has implemented FANS-1/A ATM work station and is conducting ADS-B trials using VDL Mode-4.

6.5 Mongolia has been conducting AMHS trials with Thailand and adjacent States and plans to implement AMHS by the end of 2005.

6.6 Avitech AG provided information on trials conducted to test the inter-operability of AMHS systems including preparation for the trial.

Agenda Item 7: Review Status of Implementation of AFTN circuits, evaluate circuit capacity and consider timescale for transition to ATN

AFTN Plan

7.1 The AFTN Plan Table CNS-1A was reviewed and the status of implementation of AFTN circuits was updated. The updated Table is provided in Appendix H. The main highlights of AFTN implementation made during 2003 and early 2004 were as follows:

7.1.1 AFTN Circuits

- The Brisbane/Johannesburg 64 Kbps inter-regional AFTN circuit was implemented to function as AF1/ASIA-PAC entry/exit point;
- The Dhaka/Kolkata circuit was implemented using 64 Kbps signaling speed;
- The Guangzhou/Hanoi 2400 bps circuit was implemented;
- The Karachi/Mumbai circuit was upgraded from 200 baud to 2400 bps;
- The Manila/Taibei circuit was upgraded to 300 baud;
- The Beijing/Yangon 300 baud circuit was implemented;
- The Apia/Christchurch 2400 bps was established; and
- The Christchurch/USA 9600 bps AFTN circuit was established.

7.2 The meeting proposed to replace the existing Table CNS-1A in Part IV CNS of the ASIA/PAC FASID with an updated Table and formulated the following Draft Conclusion.

Draft Conclusion 6/10 – Amendment of the Table CNS-1A – AFTN Plan

That, the Table CNS-1A – AFTN Plan and Chart CNS 1 reflected in Part IV CNS of the ASIA/PAC FASID be replaced with an updated Plan provided in Appendix H in accordance with established procedure.

AFTN Circuit Loading Statistics

7.3 Sri Lanka presented a methodology adopted in calculating AFTN circuit loading statistics for circuit operating at 9600 bps and 64 Kbps using X.25 protocol. It was agreed to include the figures for the maximum number of byte per hour and maximum number of byte per day in the existing methodology where guidance is provided for calculating loading on circuits operating up to 2400 bps.

7.4 The meeting agreed to add a Table to indicate the maximum number of bytes that can be transmitted or received for each X.25 circuits including protocol overhead in the existing guidelines contained in Attachment to ASIA/PAC FASID Part IV CNS as follows:

Signalling	Maximum Number of bytes per hour	Maximum Number of bytes per day
9600 bps	4,320,000	103,680,000
64 Kbps	28,800,000	691,200,000

In view of foregoing, the meeting formulated the following Draft Conclusion:

Draft Conclusion 6/11 – Procedure for calculation of AFTN Circuit Loading Statistics

That, the guidelines for calculation of AFTN circuit loading statistics contained in Attachment A to ASIA/PAC FASID Part IV CNS be amended to add the maximum number of bytes transmitted/received on 9600 bps and 64 Kbps, X.25, AFTN circuits.

7.5 Indonesia presented the circuit loading on the Jakarta/Brisbane and Jakarta/Singapore AFTN circuits. A review of the statistics indicated that both the circuits were operating at an occupancy level below the established occupancy level of 40%. However, it was recognized that both the circuits would be upgraded to 9600 bps by the end of 2005/2006 in accordance with Table CNS-1B.

Upgrading of the Tokyo/Moscow AFTN Circuit

7.6 Japan presented a paper stating the need for upgrading of the Tokyo/Moscow inter-regional circuit from 200 baud to 2400 bps as the circuit loading continued to exceed the occupancy level to 70% in peak hour. Japan considered that even if the proposal made by Russian Federation to change routing of some traffic via Tokyo/Khabarovsk is accepted, the occupancy level on the Tokyo/Moscow circuit would still far exceed the established occupancy level of 40%.

7.7 The meeting also noted that Japan had provided a working paper through ICAO regional office for presentation at the EUR AFSG/7 meeting held in Paris from 19 to 23 April 2004. It was further noted that the EUR AFSG/7 had recognized that the issue should be further discussed on a bi-lateral basis to work out mutually acceptable solution. Secretariat informed the meeting that Japan would be invited to attend EUR AFSG/8 meeting to be held in April 2005.

7.8 Japan stated that Russian Federation has been informed that the solution proposed for splitting the routing will not resolve problem and that circuit needs to be upgraded. Japan would continue to follow-up the matter and study another solution.

Changes in Location Indicator in Indonesia

7.9 Indonesia presented a paper providing details of the changes in location indicator as a result of change in FIR from four to two which will be effective from April 2005. In the Makassar FIR in eastern part of Indonesia, there will be one communication centre at Makassar, 12 Sub-communication centres and 16 Tributary communication centres. Voice communication services will be provided at 170 different airports using HF Single Side Band (SSB) voice communication link.

7.10 Likewise under Jakarta FIR in the western part of Indonesia, there will be a communication centre at Jakarta, 9 Sub-communication centres, 16 Tributary communication centre and at 57 airports HF SSB voice communication link will be provided.

7.11 The above changes resulted in a complete re-organization of the location indicators which will be effective from 29th September 2004. In order to provide early notification of the changes in Location Indicators, an Aeronautical Information Circular (AIC No. 01) was published on 1 April 2004. A complete list containing the changes was provided in Attachment to information paper 9 presented to the meeting.

Agenda Item 8: Review the Subject/Tasks List of the ATN Transition Task Force and develop future work of the Task Force.

8.1 The meeting reviewed the Terms of Reference and Subject/Tasks List of the Task Force, taking note of the relevant items of the key priority for the CNS/ATM Implementation approved by APANPIRG/14. The meeting did not feel the need to propose any change to the Terms of Reference.

8.2 The meeting reviewed the status of various tasks. It was noted that the Task No. 3 on the development of document on System Management was completed. The document on Performance was completed. However, it was agreed to refer it to the OPLINK Panel for comments before its adoption and the target date for completion was changed from 2004 to 2005. The title of the document "Security" was amended to read "System Integrity". It was agreed to monitor development in ACP to avoid duplication and complete this task in 2005.

8.3 The second item of Task No. 5 on the development of Table CNS-1C – ATSMHS Plan was completed. The target date of completion of Tasks 6 items 3, 4, and 6 were amended from 2004 to 2005 as the materials developed so far needed further work to complete the documents.

8.4 The target date for completion of Task No. 9 was changed to 2005 as it required further work to be done to complete it.

8.5 It was agreed to monitor developments in the ACP WG-N with respect to Task No. 10 to avoid duplication and finalize it by 2005.

8.6 The meeting amended and updated the Subject/Tasks List accordingly and formulated a Draft Decision as follows:

Draft Decision 6/12 – Revision of Subject/Tasks List of the ATN Transition Task Force

That, the updated Subject/Tasks List of the ATN Transition Task Force provided in Appendix I be adopted.

Agenda Item 9: Any other business.

9.1 The next meeting of the Task Force will be held at the ICAO Regional Office Bangkok, Thailand, in April 2005.

9.2 The meeting expressed its appreciation and gratitude to the Directorate of Air Communication for the excellent arrangement made for the meeting and provided for the warm hospitality and the opportunity to the participants to visit the places of interest.

INTERNATIONAL CIVIL AVIATION
ORGANIZATION ASIA AND PACIFIC OFFICE

Asia/Pacific Regional Aeronautical Telecommunication Network (ATN) Ground-Ground Router Description

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1.0 Introduction

The Aeronautical Telecommunication Network (ATN) is a global inter-network that provides digital communications necessary for automated systems that include; air traffic service communication (ATSC), aeronautical operational control (AOC), aeronautical administrative communication (AAC), and aeronautical passenger communication (APC).

The ATN is composed of an ATN network infrastructure and ATN applications, and provides the global communication for ground-ground (G/G) and air-ground (A/G) services. The major components of the ATN network are routers (Intermediate Systems: IS), including G/G routers, A/G routers, and communication sub-networks including air-ground and ground-ground sub-networks. The ATN applications include among others, context management (CM), controller-pilot data link communication (CPDLC), and air traffic service message handling service (ATSMHS). Applications are hosted by the End Systems (ES).

This document describes ATN G/G BIS (Boundary Intermediate System) routers planned for the Asia/Pacific region.

1.1 Scope

This document describes the protocol, performance, and management requirements for the G/G BIS (Class 4) routers that form nodes of the Asia/Pacific regional network Backbone and/or have inter-State/inter-region connectivity within the Asia/Pacific region. It provides essential procurement guidance for G/G routers to assure the interoperability of the ATN network within in the Asia/Pacific Region.

This document should be used in conjunction with ICAO Doc 9705 “Manual of Technical Provisions for the Aeronautical Telecommunication Network”, which specifies the ATN Standards and Recommended Practices (SARPs), the Asia/Pacific Regional Router Interface Control Document (ICD) for ATN G/G Router, and other applicable documents as highlighted in this document.

The router descriptions in this document include:

1. G/G router functional requirements associated with ATN Protocol Requirements Lists (APRLs) relevant to support layer 1 to layer 3 requirements, with reference to the Asia/Pacific Regional ATN Router ICD;

2. Guidelines on G/G router performance requirements to ensure the performance of the Asia/Pacific ATN network; and

3. Network management-related G/G router requirements needed to support local and Asia/Pacific regional ATN network management.

While the specifications of Intermediate Systems (whether IS or BIS) and End Systems (ES) within a domain is a local matter, parts of these guidelines may also be applicable to such systems.

1.2 SARPs Compliance

This document is applicable to ATN G/G routers that are defined as Class 4 routers in sub-volume V of the ICAO Doc 9705. ATN G/G routers must, as a minimum, conform to the mandatory ATN SARPs requirements for Class 4 routers.

While the current version of ICAO Doc 9705 is Edition 3, there are no significant differences between the mandatory requirements for Class 4 routers specified in Edition 2 and Edition 3, and it is further noted that the SARPs are generally backwards compatible between successive editions.

While Doc 9705 Edition 3 adds SARPs for ATN enhancements such as ATN Security, Directory Services and Systems Management, these enhancements are not mandatory for Class 4 routers, and the use of these enhancements for Class 4 routers is not currently planned in the Asia/Pacific region on a regional basis. Therefore, both SARPs Edition 2 compliant ATN routers and SARPs Edition 3 compliant ATN routers may satisfy the requirements of this document.

2.0 Documents

2.1 Applicable Documents

The following documents, with specific editions and/or versions, contain requirements, which, through reference in this text, constitute requirements of this document. The requirements for the ATN G/G router descriptions are specified in the following documents:

1) ICAO Doc. 9705-AN/956. Manual of Technical Provisions for the Aeronautical Telecommunication Network, Second Edition – 1999, Sub-Volume V.

2) ICAO Doc. 9705-AN/956. Manual of Technical Provisions for the Aeronautical Telecommunication Network, Third Edition – 2002, Sub-Volume V.

3) ISO/IEC 8208:1995. Information technology - Data communications - X.25 Packet Layer protocol for Data Terminal Equipment (Revision of ISO/IEC 8208:1990).

4) ISO/IEC 8473-1:1994. Information technology - Protocol for providing the connectionless-mode network service: Protocol specification.

5) ISO/IEC 8473-3:1995. Information technology - Protocol for providing the connectionless-mode network service - Part 3: Provision of the underlying service by an X.25 subnetwork.

6) ISO/IEC 8473-2:1994. Information technology - Protocol for providing the connectionless-mode network service - Part 2: Provision of the underlying service by an ISO/IEC 8802 subnetwork.

7) ISO/IEC 8802-3: 1989, Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 3: Carrier sense multiple access with collision detection - Access method and physical layer specifications.

8) ISO/IEC 8802-2: 1990, Telecommunications and information exchange between systems - Local and metropolitan area networks -Specific requirements - Part 2: Logical link control.

9) ISO/IEC 9542:1988**.** Information processing systems — Telecommunications and information exchange between systems — End system to Intermediate system routing exchange protocol for use in conjunction with the Protocol for providing the connectionless-mode network service (ISO/IEC 8473).

10) ISO/IEC 9542/DAM1: 1988. Information processing systems — Telecommunications and information exchange between systems — End system to Intermediate system routing exchange protocol for use in conjunction with the Protocol for providing the connectionless-mode network service (ISO/IEC 8473) —Amendment 1: Dynamic Discovery of OSI NSAP Addresses by End Systems.

11) ISO/IEC 10589:1992. Information technology — Telecommunications and information exchange between systems — Intermediate system to intermediate system intra-domain-routing routine information exchange protocol for use in conjunction with the protocol for providing the connectionless-mode Network Service (ISO/IEC 8473).

12) ISO/IEC 10747:1994. Information technology — Telecommunications and information exchange between systems — Protocol for exchange of inter-domain routing information among intermediate systems to support forwarding of ISO/IEC 8473 PDUs.

13) Asia/Pacific Regional Router Interface Control Document for Aeronautical Telecommunication Network Ground-Ground Router for the ISO/IEC 8208 Sub-Network, Issue 1.0.

14) Table CNS 1B "ATN Router Plan" of the ASIA/PAC FASID.

2.2 Reference Documents

The following documents are reference documents applicable to the ATN G/G router descriptions. These documents do not form a part of this document and are not referenced within the document.

1) ICAO Doc. 9739-AN/961 The Comprehensive Aeronautical Telecommunication Network Manual (CAMAL), First Edition.

2) ISO/IEC 8348:1993. Information technology - Open Systems Interconnection - Network Service Definition.

3.0 ATN Ground-Ground Router Requirements

3.1 Overview

The ATN system will provide an inter-network for the international aviation community replacing the point-to-point circuits and message-switch based services in use today for ground-ground Air Traffic Services communications. It will also introduce an air-ground mobile data service for aircraft worldwide. The ATN Network is based on the seven-layer ISO Open Systems Interconnect (OSI) model. Figure 3-1 shows the full seven-layer OSI model.

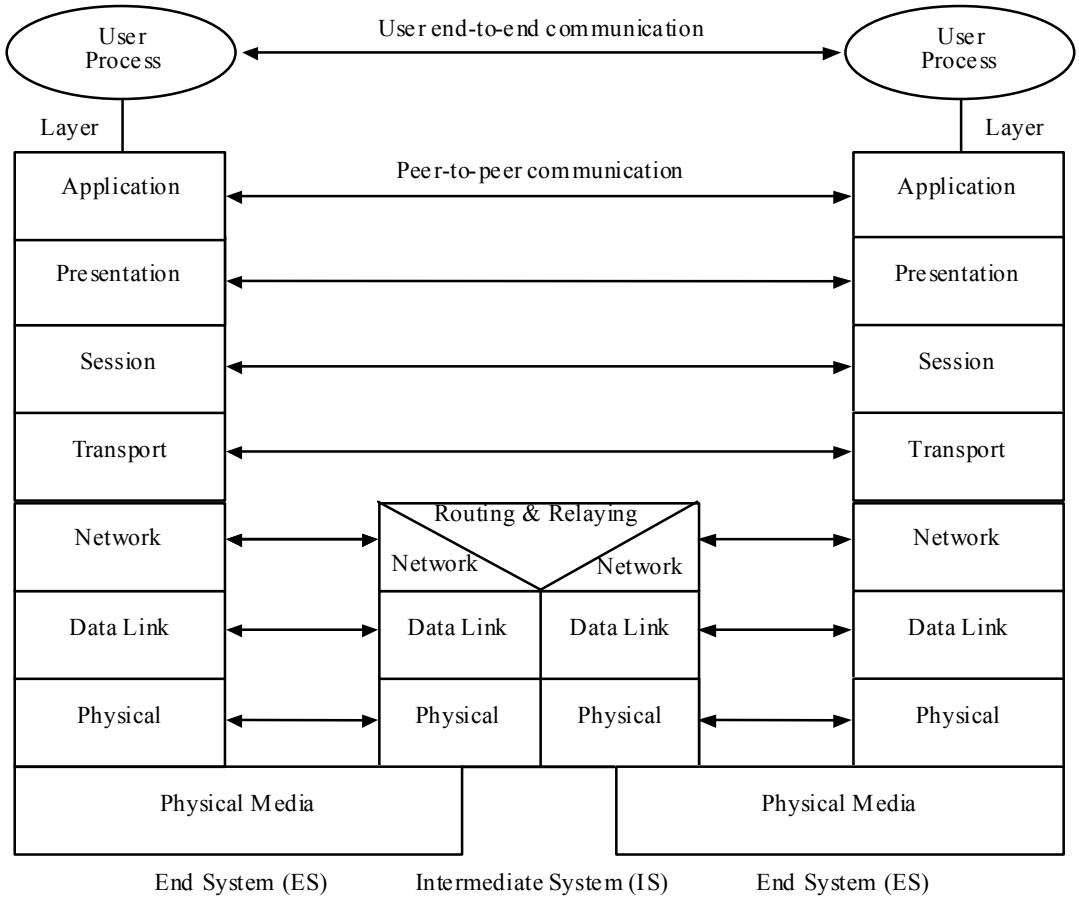


Figure 3-1 Open System Interconnection Reference Model

This document addresses the lower three layers of the OSI seven-layer model for the ATN Ground-Ground (G/G) routers in the Asia/Pacific regional ATN network.

The ATN uses the ISO/IEC8473 Connectionless Network Protocol (CLNP) as the network protocol. Data are transferred in the CLNP Protocol Data Units (PDUs) over sub-networks such as ISO/IEC 8802 Local Area Network (LAN) and ISO/IEC 8208 ("X.25") point-to-point connections or packet switched networks. ATN routers bridge these sub-networks together to form an integrated ATN network, relaying data packets between LAN and WAN, and WAN and WAN.

Class 4 routers support dynamic routing using the following routing protocols:

1) End system to Intermediate System (ES-IS) routing protocol as specified in ISO/IEC 9542 (optional);
2) Intermediate System to Intermediate System (IS-IS) routing protocol as specified in ISO/IEC 10589 (optional); and
3) Inter-domain Routing Protocol (IDRP) as specified in ISO/IEC 10747.

3.1.1 ATN G/G Router Protocol Characteristics

3.1.1.1 Application Layer

Not applicable to the router.

3.1.1.2 Presentation Layer

Not applicable to the router.

3.1.1.3 Session Layer

Not applicable to the router.

3.1.1.4 Transport Layer

Not applicable to the router.

3.1.1.5 Network Layer

The network layer includes three sub-layers:

3.1.1.5.1 Sub-network Independent Function (SNICF)

The SNICF should include the following routing and routed protocol:

a) ISO/IEC 10747 — the Inter-Domain Routing Protocol (IDRP); and
b) ISO/IEC 8473-1 — the Connectionless Network Protocol (CLNP).

The SNICF may support the following two optional routing protocols:

1. ISO/IEC 9542 — the End-System to Intermediate-System (ES-IS) protocol; and
2. ISO/IEC 10589 — the Intermediate-System-to-Intermediate-System (IS-IS) Intra-domain routing information exchange protocol.

3.1.1.5.2 Sub-network Dependent Convergence Function (SNDCF)

The proper SNDCF should be implemented for underlying sub-network(s). The most commonly implemented SNDCFs are the following:

a) ISO/IEC 8473-2 — Sub-network Dependent Convergence Function (SNDCF) for Local Area Network (LAN); and
b) ISO/IEC 8473-3 — Sub-network Dependent Convergence Function (SNDCF) for X.25 network.

3.1.1.5.3 Sub-network Sub-layer

The sub-network sub-layer is determined by the underlying sub-network. When the data are communicated over X.25 sub-network, the sub-network should include X.25 Packet Layer Protocol (PLP) as specified in ISO/IEC 8208.

3.1.1.6 Data Link Layer

The ATN G/G router Data Link Layer for use within States is a local matter and could be X.25, LAN, etc.

The Data Link Layer used between States is subject to bilateral agreement. To ensure regional interoperability, however, the data link layer requirements for ATN routers that connect to the Asia/Pacific ATN regional network are specified in the Asia/Pacific regional ATN router ICD.

3.1.1.7 Physical Layer

The ATN G/G router Physical Layer is a local or bilateral matter and could use the Physical Layer of X.25, LAN, etc.

3.2 Network Layer Requirements

The section defines the ATN G/G router network layer requirements.

3.2.1 Routing and Routed Protocols

3.2.1.1 End-System to Intermediate-System Protocol (ES-IS) (Optional)

According to ICAO Doc 9705, the ES-IS routing protocol is an optional protocol for ATN G/G routers. However, if ES-IS is supported, it is recommended that to ensure interoperability with End Systems, ATN G/G routers **should** comply with the requirements of ISO/IEC 9542 (ES-IS).

3.2.1.2 Intermediate-System to Intermediate-System Routing Protocol (IS-IS) (Optional)

According to ICAO Doc 9705, the IS-IS routing protocol is an optional protocol for ATN G/G routers. However, if IS-IS is supported, it is recommended that to ensure interoperability with IS routers, ATN G/G routers should comply with the requirements of ISO/IEC 10589 (IS-IS).

3.2.1.3 Inter-Domain Routing Protocol (IDRP)

The ATN G/G router should comply with the requirements in ISO/IEC 10747 (IDRP), section 5.8.3 of ICAO Doc 9705, and the IDRP APRLs specified in the Asia/Pacific regional Ground/Ground router ICD.

3.2.1.4 Connectionless Network Protocol (CLNP)

The ATN G/G router should comply with the requirements in ISO/IEC 8374-1, sections 5.6.2 and 5.6.3 of ICAO Doc 9705, and the CLNP APRLs specified in the Asia/Pacific regional Ground/Ground router ICD.

3.2.2 Sub-network Dependent Convergence Function (SNDCF)

Proper SNDCF should be implemented for the supported underlying sub-network(s). The following provides the requirements for SNDCFs supporting X.25 and LAN sub-networks, which are the most commonly implemented sub-networks.

3.2.2.1 X.25 SNDCF Requirements

For underlying X.25 sub-network, the ATN G/G router should comply with the requirements of ISO/IEC 8374-3 and with the APRLs specified in the Asia/Pacific regional Ground/Ground router ICD.

3.2.2.2 Local Area Network (LAN) SNDCF Requirements

The use of LAN sub-network is a local matter. However, if LAN sub-network is supported, to ensure interoperability with other systems/routers it is recommended that ATN G/G routers should comply with the requirements of ISO/IEC 8374-2.

3.2.3 Sub-Network Sub-layer

The sub-network sub-layer is based on the sub-network. When X.25 is used, the ATN router should support the X.25 Packet Layer Protocol (PLP) as specified in Asia/Pacific regional G/G router ICD.

3.3 Data Link Layer Requirements

The following are the Data Link Layer requirements for X.25 and LAN.

3.3.1 X.25 Data Link Layer

When X.25 is used, the ATN G/G router should support the X.25 Data Link Layer requirements as specified in the Asia/Pacific regional G/G router ICD.

3.3.2 LAN Data Link Layer

3.3.2.1 LAN Logical Link Control (LLC)

When LAN is used, the ATN G/G router should support Logical Link Control (LLC) Type 1 connectionless-mode operation requirements specified in ISO/IEC 8802-2.

3.3.2.2 LAN Media Access Control (MAC)

When LAN is used, the ATN G/G route should support the media access control (MAC) using carrier sense multiple access with collision detection (CSMA/CD) defined in ISO/IEC 8802-3.

3.4 Physical Layer Requirements

The Physical Layer is a local matter. The following Physical Layer requirements can be used as references for X.25 and LAN sub-networks.

3.4.1 X.25 Physical Layer

The physical layer requirements are a local matter.

3.4.2 LAN Physical Layer

LAN physical layer should comply with the following minimum requirements:

1. The physical layer should comply with ISO/IEC 8802-3.

2. The router should be capable of supporting 10Base-T physical medium.

3. The physical media dependent interface (MDI) connector should use RJ-45 connector.

4.0 Performance Recommendations

The ATN G/G router performance requirements depend on the ATN network traffic, network planning, services requirements and bilateral agreements.

The follows are the baseline ATN G/G performance recommendation and guidelines.

4.1 Communications Performance and Capacity

The required communication performance of the ATN router (circuit speeds, number of circuits, throughput etc.) should be first determined. This may be achieved by analysis of existing communications traffic levels and the bandwidth and latency requirements of current and future applications. The following are general guidelines for ATN Backbone BIS (BBIS) routers.

4.1.1 WAN Performance

A WAN connection over X.25 is implemented as Virtual Circuit (VC), where more than one VC can share a common physical circuit using logical channels. The router WAN connectivity capability can therefore be expressed in terms of number of VCs supported per physical circuit and number of supported physical circuits.

Where several WAN connections share a common physical circuit, the capacity of the circuit is divided amongst the logical channels and represents a single point of failure. It may be therefore advisable from a performance and failure point of view to distribute the WAN connections over several physical ports. In the case of a large number of WAN connections, it may be advisable to split the connections between more than one BIS.

During transition from AFTN to ATN/AMHS, the ATN link may share the same physical circuit as an existing AFTN link by using a separate logical channel.

4.1.1.1 Circuit Bandwidth

The minimum supported WAN bandwidth should be at least the maximum of the link speeds to the adjacent ATN BIS routers specified in Table CNS 1B of the ASIA/PAC FASID. However, in order to satisfy future network traffic growth, it is recommended that the minimum supported WAN speed should be 64 kbps.

4.1.1.2 Number of WAN Connections

The number of simultaneous WAN connections that must be supported by the BIS depends on the number of adjacent BIS, IS and ES that must be connected by WAN. It is recommended that the BIS router should be capable of supporting at least six physical circuits (assumed two diversified circuits for inter-domain IDRP, two diversified circuits for intra-domain ISIS, and two reserved for ESIS or future expansion), and at least one Virtual Circuit per physical circuit.

4.1.2 LAN Performance

The minimum LAN speed should be at least 10 Mbps.

Note: Most modern LAN devices are capable of supporting both 10Mbps and 100Mbps.

4.1.3 Router Throughput and Delay

4.1.3.1 Throughput

The ATN G/G router throughput should be determined base on the analysis of traffic through the node where ATN G/G router is located. The analysis should consider the current traffic, planned application traffic, and future growth projection.

The following is the example of a throughput calculation. Assuming,

1. CLNP NPDU payload size is minimum 38 bytes;
2. Out of six (6) WAN ports, three (3) ports are operating and fully loaded; and
3. During the normal operation, assuming less than 60% fully loaded.

Using the above assumption 1), the X.25 frame length should be 100 bytes minimum (NPDU payload plus the CLNP overhead: 57 bytes, X.25: 3 bytes, HDLC: 2 bytes).

Then with the assumption 2), the ATN G/G router throughput should be 240 NPDUs/sec (64Kbps*3/100/8) for fully loaded. Considering about 40% off, 150 NPDUs/sec is recommended.

4.1.3.2 Delay

The ATN G/G router delay requirement should be determined base on the analysis of node where ATN router shall be implement.

According to the results of the example in 4.1.3.1 and assuming that only 50% of the router processing time is used for processing an NPDU, the processing time for each NPDU will be 3.33 milliseconds (0.5second/150NPDUs). Considering the queuing delay, the throughput delay time is assumed to be 5 milliseconds.

The ATN G/G router throughput delay should not exceed 5 milliseconds from the above example.

4.2 Availability and Reliability

The availability of routing service is determined based on Mean Time Between Failures (MTBF) of the routers and downtime. In the network design, availability requirements should first be determined and the network should then be designed to achieve this with given equipment reliability. Availability requirements are higher for BBIS routers that are in Transit Routing Domains and relay traffic for other States than for BIS routers in End Routing Domains, and also depend on the type of applications that use the network infrastructure.

1. For ATN Backbone BIS (BBIS) routers, a high level of availability of the routing service is required. This may be achieved either by using routers that have internal redundancy (e.g. dual-redundant systems) or by the use of multiple non-redundant routers, with automatic switchover capability in the event of failure.

   Where such high levels of availability are not required, use of multiple routers with manual switchover in the event of failure within a certain time period, or identification of faults and replacement of malfunctioning units within a certain time period, may be acceptable methods of meeting availability requirements.

2. The maximum allowed routing service downtime is determined based on maintenance contract. Use of multiple or redundant routers may help to maintain routing service availability during scheduled maintenance downtime.

An example of computation of MTBF for a dual-redundant router is given in Appendix A.

5.0 Network Management Capability

The ATN G/G router should provide a network management agent capable of supporting the network management provisions defined in ICAO Doc 9705 section 6.3.

The Common Management Information Protocol (CMIP) is the network management protocol specified for ATN in Edition 3 of ICAO Doc 9705. ATN network management sees the use of CMIP to allow direct access to network management information across domains in real-time. However, there are currently no requirements for such real-time inter-domain management information sharing within the ICAO Asia/Pacific region. Further, there are very few commercially available CMIP products at present. Implementation of ATN SARPs compliant CMIP agent in the router is therefore optional for Asia/Pacific region Class 4 routers at present.

For local management of the ATN routers within a domain, use of the Simple Network Management Protocol (SNMP) is recommended, given the widespread availability of commercial off-the-shelf SNMP server (network management) products.

It is recommended that the ATN router have a function to generate ECHO Request (ERQ) NPDUs for fault and performance investigation.

6.0 Security and System Integrity

6.1 System Integrity

Specific measures to ensure system integrity (e.g. prevention of unauthorized operation or use of resources) are a local matter, but overall policy for the Asia/Pacific region will be specified in the Asia/Pacific Systems Integrity Policy document currently under development. Generally, it is assumed that ATN routers operated by States for the Asia/Pacific ATN ground network will be in secure environments and connected to only private networks.

1. The ATN router should have functions that prevent unauthorized control of the router (e.g. user authentication).

6.2 ATN Security

Implementation of the technical provisions for ATN Security applicable to ATN routers specified in ICAO Doc. 9705 sub-volume V and sub-volume VIII, that is, Type 2 Authentication in IDRP, is not currently required in Asia/Pacific regional policy but may be required in future when the regional network has reached a level of maturity.

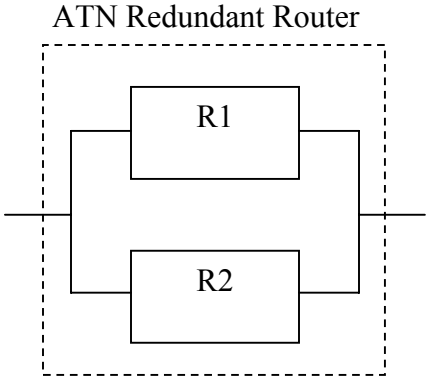
Routers should authenticate the router to which they are connected, either through simpler or strong (cryptographic) means. Use of additional security measures such as Type 2 Authentication is optional and may be use subject to bi-lateral agreement.

Note: Use of dedicated (private) circuit between two ATN routers is a possible means of simple authentication.

APPENDIX A REDUNDANT ROUTER MTBF CALCULATION

The MTBF of a redundant ATN router is analyzed under the assumption of no service loss during a single router switchover.

Considering a redundant system with two routers, the relation between redundant system MTBF and single router MTBF is derived as below.



Assumptions and definitions:

- Assume two routers are identical and have the same MTBF.
- Let router $MTBF_{R1}$=$MTBF_{R2}$ =$MTBF_R$.
- Let redundant system MTBF be $MTBF_S$.
- Let router fail rate $\lambda_{R1} = \lambda_{R2} = \lambda_R = 1/MTBF_R$.
- Let redundant system fail rate $\lambda_S = 1/MTBF_S$.
- Assume reliability of each router is Poisson distribution: $R_{R1}(t) = R_{R2}(t) = R_R(t) = e^{-\lambda_R t}$.
- Assume reliability of the redundant system is Poisson distribution: $R_S(t) = e^{-\lambda_S t}$.

The reliability of redundant system:

$$\begin{aligned} R_S(t) &= 1-(1-R_{R1}(t))(1-R_{R2}(t)) \\ &= R_{R1}(t)+R_{R2}(t)-R_{R1}(t)R_{R2}(t) \\ &= 2e^{-\lambda_R t}-e^{-2\lambda_R t} \end{aligned}$$

Then $e^{-\lambda_S t} = 2e^{-\lambda_R t} - e^{-2\lambda_R t}$

Integrate the above equation form 0 to infinite

$$\int_0^\infty e^{-\lambda_S t}dt = \int_0^\infty 2e^{-\lambda_R t}dt - \int_0^\infty e^{-2\lambda_R t}dt$$

$$\frac{1}{-\lambda_S} e^{-\lambda_S t}\Big|_0^\infty = \frac{2}{-\lambda_R} e^{-\lambda_R t}\Big|_0^\infty - \frac{1}{-2\lambda_R} e^{-\lambda_R t}\Big|_0^\infty$$

$$\frac{1}{\lambda_S} = \frac{2}{\lambda_R} - \frac{1}{2\lambda_R} = \frac{3}{2\lambda_R}$$

Then $$MTBF_S = \frac{3}{2} MTBF_R$$

Based on industrial survey, the minimum of 40,000 hours MTBF for any server is supportable. According to the assumption of minimum of 40,000 hours MTBF for a single server (router), the redundant system MTBF can be calculated as 60,000 hours.

APPENDIX B ACRONYMS

A/G	(Air-Ground)
AMHS	(ATS message handling system)
APRL	(ATN profile requirement list)
ATC	(Air Traffic Control)
ATN	(Aeronautical Telecommunication Network)
ATS	(Air Traffic Service)
ATSMHS	(ATS Message Handling System)
BIS	(Boundary Intermediate System)
CLNP	(Connectionless Network Protocol)
CLNS	(Connectionless Network Service)
CMIP	(Common Management Information Protocol)
CSMA/CD	(Carrier Sense Multiple Access with Collision Detection)
ES	(End system)
ESs	(End Systems)
G/G	(Ground-Ground)
ICAO	(International Civil Aviation Organization)
ICD	(International Code Designator)
IDRP	(Inter-Domain Routing Protocol)
IEC	(International Electrotechnical Commission)
IEEE	(International Electrical and Electronics Engineering)
IS	(Intermediate system)
ISO	(International Standardization Organization)
ISs	(Intermediate Systems)
LLC	(Logical Link Control)
MAC	(Multiple Access Control)
MDI	(Medium Independent Interface)
NPDUs	(Network Protocol Data Units)
NSAP	(Network Service Access Point)
PUD	(Protocol Data Unit)
PLP	(Packet Layer Protocol)
QOS	(Quality of Service)
RD	(Routing domain)
RIB	(Routing Information Base)
SARPs	(Standard and Recommendation Practices)
RDs	(Routing Domains)
SNDCF	(Subnetwork Dependent Convergence Function)
SNICF	(Subnetwork Independent Convergence Function)
SNMP	(Simple Network Management Protocol)
TBD	(To Be Determined)
TBP	(To Be Proposed)

AMHS NAMING REGISTRATION FORM

DOCUMENTATION OF AMHS MTA AND END-USER NAMES

Explanation of the Table 1

Legend:

ID:	Numbering scheme where each naming domain is assigned an ordinal number with each user on the MTA a sub-ordinate number.
AMHS Domain:	The ATN AMHS name prefix (management domain) as defined in ICAO Doc. 9705. There are two formats of the AMHS name prefix, XF and CAAS.
MTA Name:	The name of the MTA hosting the AMHS user.
AMHS User Name:	The 8-character user name.
Domain Type:	The format of the AMHS name used. Values are limited to XF or CAAS.
Description of User Name:	
Point of Contact:	The person or office to contact about further information about this entry.
Location:	The physical location of the system. This may be either an address or an AFTN location identifier.

ID	AMHS Domain	MTA Name	AMHS User Name	CAAS or XF	Description of User Name	Point of Contact	Location
1	C=XX, ADMD=ICAO, PRMD=K, O=AFTN,	kslcmta		XF		Hoang Tran	USA
1.1			KSLCATNX		AMHS Operator		
1.2							
1.3							
1.4							
1.5							
1.6							
1.7							
1.8							

Table 1 – Documentation of AMHS MTA and End-User Names

AMHS NAMING REGISTRATION FORM

DOCUMENTATION OF AMHS MTA

Explanation of the Table 2

Legend:

MTA ID:	Numbering scheme where each entry is assigned an ordinal number.
MTA Name:	This field is used to provide the MTA name used in AMHS BINDs.
Element ID:	This field is the linkage between Table 1 and Table 2 and is the ID field from Table 1.
NSAP:	This field is used to indicate the NSAP assigned to the MTA.
Point of Contact:	The person or office to contact about further information about this entry.

MTA ID	MTA Name	Element ID	NSAP	Capabilities	Point of Contact
1	kslcmta	1	47002781555341000101010101000002020203 01	Basic service	Hoang Tran
2					
3					
4					
5					
6					
7					

Table 2 – Documentation of AMHS MTA

An extract from the ASIA/PAC Regional ATN Planning Document

3. DOCUMENTATION PROFILES

3.1 ICAO Annex10 Vol. III

Title: International Standards and Recommended Practices, Aeronautical Telecommunications, Annex 10 Volumes III.

Latest Version: March 2001

Purpose: This ICAO document defines the Standards and Recommended Practices (SARPs) for the Aeronautical Telecommunications Network (ATN).

Contents: Subjects covered by the document:

- Part I – Digital Data communication Systems.
  - Chapter 1 – Definitions.
  - Chapter 3 – Aeronautical Telecommunication Network.
  - Chapter 4 – Aeronautical Mobile-Satellite Service.
  - Chapter 6 – VHF Air-Ground Digital Link (VDL).
  - Chapter 8 – AFTN.
- Part II – Voice Communication Systems.
  - Chapter 2 – Aeronautical Mobile Service.
  - Chapter 4 – Aeronautical Speech Circuits.
  - Chapter 5 – Emergency Locator Transmitter (ELT) for search and rescue.

3.2 Manual of Technical Provisions for the Aeronautical Telecommunication Network - ICAO DOC 9705 – AN/956

Title: Manual of Technical Provisions for the Aeronautical Telecommunication Network (ATN).

Latest Version: 3rd Edition

Purpose: This ICAO manual contains detailed technical information and serves to further elaborate on the ATN standards as defined in Chapter 3 of Annex 10, Volume III, Part I.

Contents: Subjects covered by the document:

- Sub-Volume I – Introduction and System Level Requirements.
- Sub-Volume II – Air-Ground Applications.
- Sub-Volume III – Ground-Ground Applications.
- Sub-Volume IV – Upper Layer Communications Services (ULCS).
- Sub-Volume V – Internet Communications Services (ICS).
- Sub-Volume VI – ATN Systems Management Provisions.
- Sub-Volume VII – ATN Directory Service.
- Sub-Volume VIII – ATN Security Service.
- Sub-Volume IX – ATN Identifier Registration.

3.3 Comprehensive Aeronautical Telecommunications Network Manual (CAMAL) - ICAO DOC 9739 – AN/961

Title: Comprehensive Aeronautical Telecommunications Network (ATN) Manual.

Latest Version: 2nd Edition - 2002

Purpose: This document provides guidance material in support of the ATN SARPS as defined in Annex 10, Vol. III and Doc. 9705.

Contents: Subjects covered by the document:

- Components, functionality and concepts of the ATN.
- ATN Internet lower layer routing protocols.
- ATN Upper layer application protocols.
- ATN subnetworks and corresponding SNDCF's layers.
- Air-ground applications, ADS, CPDLC, CM, FIS.
- Ground-Ground applications ATSMHS, AIDC.

3.4 ATN IDRP Routing Policy

Title: Asia/Pacific ATN IDRP Routing Policy.

Latest Version: 2.0 April 2004

Purpose: This document provides policy for ATN routers operating in the ASIA and Pacific Region in support of ATSMHS and other ATN services.

Contents: Subjects covered by the document:

- Routing policy goals
- Policy requirements for ATN routers

3.5 AMHS MTA Routing Policy

Title: Asia/Pacific AMHS MTA Routing Policy.

Latest Version: To be developed

Purpose:

Contents:

3.6 Directory

Title: Asia/Pacific Technical Document on Use of Directory Services.

Latest Version: To be developed

Purpose:

Contents:

3.7 System Management Transition Guideline

Title: Asia/Pacific Regional System Management Transition Guideline Document.

Latest Version: To be developed

Purpose:

Contents:

3.8 Performance

Title: Asia/Pacific Technical Document on ATN Performance.

Latest Version: Draft – April 2004

Purpose: The document provides the technical guidance related to the ATN performance. Information on the definition of performance, especially Required Communication Performance (RCP), and the planning as well as the monitoring of ATN performance is provided.

Contents: Subjects covered by the document:

- Background
- Activities Related to Performance
- Definition of Aeronautical Telecommunication Performance
- Characteristics of Aeronautical Telecommunication
- Required Communication Performance
- Planning Communication Performance
- Deriving Performance Requirements
- Stating Performance Requirements
- Installing Performance Requirements
- Planning for Monitoring, Evaluation, and Improving Performance

3.9 System Integrity Policy

Title: Asia/Pacific Policy for ATN System Integrity.

Latest Version: Draft - November 2003

Purpose: The System Integrity Policy defines the rules governing the protection of ATN data, services, and resources associated with ATN applications and processes from both unintentional defect and deliberate attack. The document contains high-level system integrity requirements, defines system integrity services and associated policy statements, and requires that ATN systems undergo a verification and authorization process whereby systems are formally approved for operation by a Designated Approving Authority.

Contents: Subjects covered by the document:

- Purpose
- Applicability
- Authority
- Implementation and Enforcement
- System Integrity Requirements
- System Integrity Services
- System Integrity Policy Statements
- Verification and Authorization

3.10 ATN G/G Router ICD

Title: Asia/Pacific Regional Interface Control Document for ATN Ground to Ground Router for ISO/IEC 8208 sub network.

Latest Version: 1.0 - August 2003

Purpose: This document provides ICD for interconnecting ATN G/G routers between states/organizations for ISO/IEC 8208 sub network.

Contents: Subjects covered by the document:

- ATN G/G Router Overview.
- Physical Layer.
- Data Link Layer.
- Network Layer.

3.11 ATN A/G Router ICD

Title: Asia/Pacific Regional Router Interface Control Document for ATN Air to Ground Router.

Latest Version: To be developed

Purpose:

Contents:

3.12 ATN Ground-Ground Transition Plan

Title: ASIA/PAC ATN Transition Plan.

Latest Version: 1.0

Purpose: This document describes the transition activities that are to be performed by States in the region for a coordinated migration from AFTN to the new ATN environment.

Contents: Subjects covered by the document:

- Existing ground infrastructure.
- ATN End system applications.

- ATN Traffic, both ground-ground and air-ground communication paths.
- ATN routing architecture.
- ATN backbone trunks.
- Interconnection of ATN routers.
- Transition activities.

Remarks: Subsequent to discussions stemming from the CNS/MET SG/5 meeting much of the document's contents has been included into the CNS FASID. This document will under go no further revisions.

3.13 ATN Routing Architecture

Title: Asia/Pacific ATN Routing Architecture.

Latest Version: 1.0

Purpose: This document presents the routing architecture for the ground-ground infrastructure to eventually replace the existing AFTN. It is intended that this architecture will also be suitable for the accommodation of the air-ground communications traffic at some later time.

Contents: Subjects covered by the document:

- Routing Domain Fundamentals.
- Router Fundamentals.
- Asia/Pacific regional routing architecture.
- Routing domains.
- ATN Transition.

3.14 ATN NSAP Addressing Plan

Title: Asia/Pacific ATN Addressing Plan.

Latest Version: 1.0

Purpose: This document presents recommendations for the assignment of ATN NSAP addresses within the region. It also defines the methods by which values are assigned to each field of the NSAP Address and specifies the assumptions upon which the addressing format has been defined.

Contents: Subjects covered by the document:

- NSAP Address structure to be adopted by states of the Asia/Pacific Region.
- Recommendations for the values of each field of the NSAP address.
- Authority responsible for NSAP field assignments.

3.15 AMHS Naming Plan

Title: Asia/Pacific AMHS Naming Plan.

Latest Version: 1.0

Purpose: This document presents recommendations for the AMHS naming conventions to be adopted by AMHS users within the region.

Contents: Subjects covered by the document:

- MF-Addressing scheme.
- XF-Addressing scheme.
- Conventions for use of MF-Addressing Format.
- Conventions for use of XF-Addressing Format.
- General use of X.400 O/R Addresses.

3.16 ATN NSAP Registration Form

Title: Asia/Pacific ATN NSAP Registration Form.

Latest Version: 1.0

Purpose: This document specifies the information that is required for registration of devices that are to connect to the ATN environment within the Region.

Contents: Subjects covered by the document:

- Registration of NSAP Addresses for ATN Routers and ATN End-System.
- Registration of Communication Circuits for ATN Routers and ATN End-Systems.

3.17 Guidance Material for Ground Elements in ATN Transition

Title: Guidance Material for Ground Elements in ATN Transition.

Latest Version: 2.0

Purpose: This document contains guidance material for ATN transition planning within the Asia/Pacific region.

Contents: Subjects covered by the document:

- ATN overview
    - Ground-ground service components.
    - Air-ground service components.
    - ATN security service.
    - ATN system management.
    - ATN directory.
- Planning Issues to be considered
    - ATM operational concept.
    - Transition planning.
    - Implementation planning.
    - Proposed regional planning activities for transition.
    - Proposed State planning activities for transition.
- Guidance material for ground based elements

- Integration of new and existing infrastructure.
- Message service definition, benefit and procedure in inter-domain operation.
- Guidance for administrative domain definition.
- Guidance for architectural design of ATN ground elements.
- Connection for inter-domain operation and guidance material.
- Identification of traffic type, quality of service with respect to inter-domain operation.
- Performance issues of reliability, maintainability, and reliability with respect to inter-domain operation.
- Transition paths and transitional procedure in inter-domain operation.
- Cost analysis of ATN ground elements in transitional development for inter-domain operation.
- ATN security solution.

3.18 AMHS ICD

Title: ICD for ATS Message Handling System (AMHS) in Asia/Pacific Region

Latest Version: 1.0 – September 2002

Purpose: This ICD has been developed in order to facilitate interoperability between States in the deployment of AMHS within the Asia/Pacific region.

Contents: Subjects covered by the document:

- AMHS functions.
- Network configuration.
- Protocol specification overview.
- AMHS specifications.
- Upper layer specifications.
- Lower layer specifications.
- AHMS PICS.

3.19 Facilities and Services Implementation Document (FASID)

Title: Facilities and Services Implementation Document.

Latest Version: First Edition

Purpose: This document contains elements of Part IV, CNS of the Asia/Pacific FASID.

Contents: Subjects covered by the document:

- Table 1A, AFTN/Circuit Plan.
- Table 1B, ATN Router Plan.
- Table 1C, ATSMHS Routing Plan.
- Table 1D, AIDC Circuit Plan.

3.20 System Management Policy

Title: Asia/Pacific Policy for ATN System Management.

Latest Version: Draft - April 2004

Purpose: The System Management Policy defines the rules governing management of ATN data, services, and resources associated with ATN applications and processes. The document defines system management services and associated policy statements, and requires that all ATN systems have a responsible system manager.

Contents: Subjects covered by the document:

- Purpose
- Applicability
- Authority
- Implementation and Enforcement
- System Management Services
- System Management Policy Statements
- Responsible System Manager

3.21 System Integrity Verification Checklist

Title: Asia/Pacific System Integrity Verification Checklist.

Latest Version: Draft - April 2004

Purpose: The System Integrity Verification Checklist contains a sample list of management, operational and technical controls which are examined during the verification process.

Contents: Subjects covered by the document:

- Sample Management Controls
- Sample Operational Controls
- Sample Technical Controls

3.22 System Integrity Sample Authorization

Title: Asia/Pacific System Integrity Sample Authorization.

Latest Version: Draft - April 2004

Purpose: The sample System Integrity authorization provides a signature template for the formal approval for operation by the Designated Approving Authority.

Contents: Subjects covered by the document:

- Statement/Signature for Verification
- Statement/Signature for Authorization

An extract from the ASIA/PAC Regional ATN Planning Document

3. DOCUMENTATION PROFILES

3.1 ICAO Annex10 Vol. III

Title: International Standards and Recommended Practices, Aeronautical Telecommunications, Annex 10 Volumes III.

Latest Version: March 2001

Purpose: This ICAO document defines the Standards and Recommended Practices (SARPs) for the Aeronautical Telecommunications Network (ATN).

Contents: Subjects covered by the document:

- Part I – Digital Data communication Systems.
  - Chapter 1 – Definitions.
  - Chapter 3 – Aeronautical Telecommunication Network.
  - Chapter 4 – Aeronautical Mobile-Satellite Service.
  - Chapter 6 – VHF Air-Ground Digital Link (VDL).
  - Chapter 8 – AFTN.
- Part II – Voice Communication Systems.
  - Chapter 2 – Aeronautical Mobile Service.
  - Chapter 4 – Aeronautical Speech Circuits.
  - Chapter 5 – Emergency Locator Transmitter (ELT) for search and rescue.

3.2 Manual of Technical Provisions for the Aeronautical Telecommunication Network - ICAO DOC 9705 – AN/956

Title: Manual of Technical Provisions for the Aeronautical Telecommunication Network (ATN).

Latest Version: 3rd Edition

Purpose: This ICAO manual contains detailed technical information and serves to further elaborate on the ATN standards as defined in Chapter 3 of Annex 10, Volume III, Part I.

Contents: Subjects covered by the document:

- Sub-Volume I – Introduction and System Level Requirements.
- Sub-Volume II – Air-Ground Applications.
- Sub-Volume III – Ground-Ground Applications.
- Sub-Volume IV – Upper Layer Communications Services (ULCS).
- Sub-Volume V – Internet Communications Services (ICS).
- Sub-Volume VI – ATN Systems Management Provisions.
- Sub-Volume VII – ATN Directory Service.
- Sub-Volume VIII – ATN Security Service.
- Sub-Volume IX – ATN Identifier Registration.

3.3 Comprehensive Aeronautical Telecommunications Network Manual (CAMAL) - ICAO DOC 9739 – AN/961

Title: Comprehensive Aeronautical Telecommunications Network (ATN) Manual.

Latest Version: 2nd Edition - 2002

Purpose: This document provides guidance material in support of the ATN SARPS as defined in Annex 10, Vol. III and Doc. 9705.

Contents: Subjects covered by the document:

- Components, functionality and concepts of the ATN.
- ATN Internet lower layer routing protocols.
- ATN Upper layer application protocols.
- ATN subnetworks and corresponding SNDCF's layers.
- Air-ground applications, ADS, CPDLC, CM, FIS.
- Ground-Ground applications ATSMHS, AIDC.

3.4 ATN IDRP Routing Policy

Title: Asia/Pacific ATN IDRP Routing Policy.

Latest Version: 2.0 April 2004

Purpose: This document provides policy for ATN routers operating in the ASIA and Pacific Region in support of ATSMHS and other ATN services.

Contents: Subjects covered by the document:

- Routing policy goals
- Policy requirements for ATN routers

3.5 AMHS MTA Routing Policy

Title: Asia/Pacific AMHS MTA Routing Policy.

Latest Version: To be developed

Purpose:

Contents:

3.6 Directory

Title: Asia/Pacific Technical Document on Use of Directory Services.

Latest Version: To be developed

Purpose:

Contents:

3.7 System Management Transition Guideline

Title: Asia/Pacific Regional System Management Transition Guideline Document.

Latest Version: To be developed

Purpose:

Contents:

3.8 Performance

Title: Asia/Pacific Technical Document on ATN Performance.

Latest Version: Draft – April 2004

Purpose: The document provides the technical guidance related to the ATN performance. Information on the definition of performance, especially Required Communication Performance (RCP), and the planning as well as the monitoring of ATN performance is provided.

Contents: Subjects covered by the document:

- Background
- Activities Related to Performance
- Definition of Aeronautical Telecommunication Performance
- Characteristics of Aeronautical Telecommunication
- Required Communication Performance
- Planning Communication Performance
- Deriving Performance Requirements
- Stating Performance Requirements
- Installing Performance Requirements
- Planning for Monitoring, Evaluation, and Improving Performance

3.9 System Integrity Policy

Title: Asia/Pacific Policy for ATN System Integrity.

Latest Version: Draft - November 2003

Purpose: The System Integrity Policy defines the rules governing the protection of ATN data, services, and resources associated with ATN applications and processes from both unintentional defect and deliberate attack. The document contains high-level system integrity requirements, defines system integrity services and associated policy statements, and requires that ATN systems undergo a verification and authorization process whereby systems are formally approved for operation by a Designated Approving Authority.

Contents: Subjects covered by the document:

- Purpose
- Applicability
- Authority
- Implementation and Enforcement
- System Integrity Requirements
- System Integrity Services
- System Integrity Policy Statements
- Verification and Authorization

3.10 ATN G/G Router ICD

Title: Asia/Pacific Regional Interface Control Document for ATN Ground to Ground Router for ISO/IEC 8208 sub network.

Latest Version: 1.0 - August 2003

Purpose: This document provides ICD for interconnecting ATN G/G routers between states/organizations for ISO/IEC 8208 sub network.

Contents: Subjects covered by the document:

- ATN G/G Router Overview.
- Physical Layer.
- Data Link Layer.
- Network Layer.

3.11 ATN A/G Router ICD

Title: Asia/Pacific Regional Router Interface Control Document for ATN Air to Ground Router.

Latest Version: To be developed

Purpose:

Contents:

3.12 ATN Ground-Ground Transition Plan

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    - ATM operational concept.
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- Lower layer specifications.
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- Table 1C, ATSMHS Routing Plan.
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Latest Version: Draft - April 2004

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Contents: Subjects covered by the document:

- Purpose
- Applicability
- Authority
- Implementation and Enforcement
- System Management Services
- System Management Policy Statements
- Responsible System Manager

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Title: Asia/Pacific System Integrity Verification Checklist.

Latest Version: Draft - April 2004

Purpose: The System Integrity Verification Checklist contains a sample list of management, operational and technical controls which are examined during the verification process.

Contents: Subjects covered by the document:

- Sample Management Controls
- Sample Operational Controls
- Sample Technical Controls

3.22 System Integrity Sample Authorization

Title: Asia/Pacific System Integrity Sample Authorization.

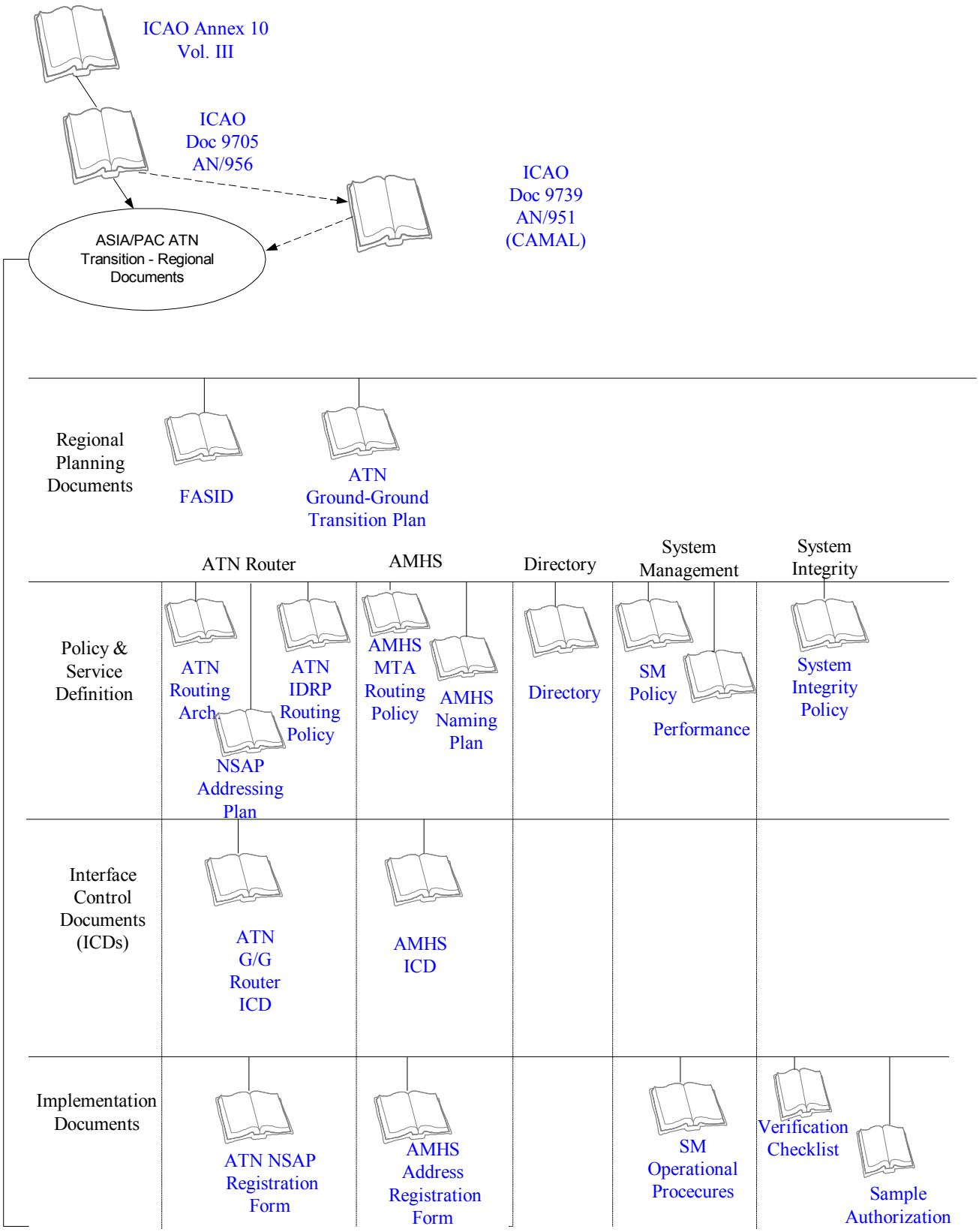
Latest Version: Draft - April 2004

Purpose: The sample System Integrity authorization provides a signature template for the formal approval for operation by the Designated Approving Authority.

Contents: Subjects covered by the document:

- Statement/Signature for Verification
- Statement/Signature for Authorization

DOCUMENTATION TREE - APRIL 2004



International Civil Aviation Organization
Asia and Pacific Office

Asia/Pacific Regional ATN Implementation System Management Operational Procedures

SUMMARY

This document is intended to provide initial direction and guidance in the identification, development, and selection of ATN administrative management tools, agreements and documents necessary to facilitate and continue operation required for transition from current systems and methods to the ATN.

Version 1 – April 2004

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2. Introduction
   2.1 Objectives
   2.2 Scope
   2.3 References
   2.4 Definitions

3. General Requirements for ATN Management

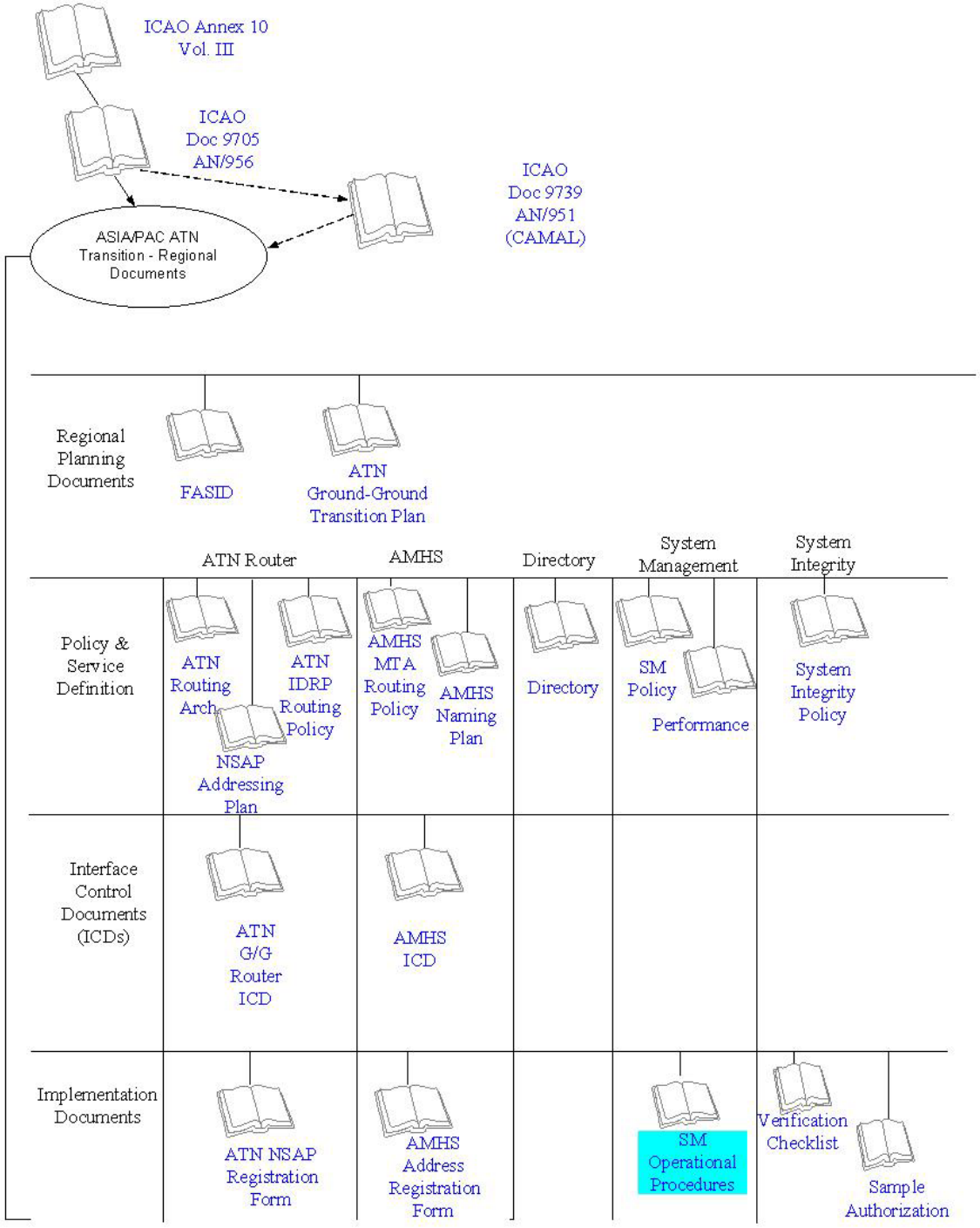
4. Supporting Management and Implementation Agreements
   4.1 ***Service*** Level Agreements (SLA)
   4.2 Memorandum of Agreement (MOA)
   4.3 Technical Memorandums of Cooperation (TMC)

5. Legacy ***Systems***

6. Informational Knowledge Base ***System*** Management Elements for ATN
   6.1 Information Objects

7. Summary of Recommendations
8. Examples of Management Procedural Agreements.
   8.1 Appendix A: Example ***Service*** Level Agreement (SLA)
   8.2 Appendix B: Example Memorandum of Agreement (MOA)

1.0 Location in Documentation Tree



2. Introduction:

The Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) develops documents that will facilitate and guide the Asia and Pacific regions in the introduction and implementation of ATN in the region. This document is developed as a reference guideline for the introduction of necessary administrative ATN management guidelines and documents supporting the development, deployment, and administrative operation of the ATN/AMHS. In-depth technical provisions and specifications that support ATN management are referenced but not included and considered beyond the scope of this document.

ICAO SARPs, technical documentation and CAMALs effectively describe the technical requirements for ATN ***system*** management and ***system*** conceptual operations. It is the intent of this document to identify documents and policies that will facilitate the effective deployment and continued efficient operation of the ***service***.

2.1 Objectives

The objective of this document is the facilitation and establishment of ATN management practices that augment operational practices, policies, and procedures within the region.

2.2 Scope

Scope includes:

- Introduction of applicable management concepts
- Establishment of documents governing ATN ***service*** management
- Activities performed
- Definition of management information

2.3 References

References include:

- Manual of technical provisions for the ICAO ATN (Doc 9705-AN/956) Third Edition
- ICAO ATN CAMAL (Doc 9739-AN/961)
- ISO/IEC and ITU-T International standards for the OSI environment

2.4 Definitions for the purpose of this document:

- ***Administration*:**
  An entity that governs and controls most aspects associated with the support and operation of specific business functions.

- ***Application***
  A practical use of software (computer code) designed and written to achieve specific or multiple tasks employing physical elements to accomplish the direction.
  ***Authority*:**
  An ***Administration***, ***Institution***, or individual that has the weight to govern and direct compliance with guidelines and directives.
- ***Boundary device*:**
  A ***system*** element or device that is located logically between and used by multiple ATN ***system*** owners or operators**.** The efficient operation of the ***boundary device*** could effect the efficient operation of more than one ***domain***. Simply a device such as a router shared by multiple ***domains***.
- ***Domain*:**
  A set of resources under the control of a single entity.
- ***Institution*:**
  A single regional body having ultimate responsibility for operation and compliance of the Region. ***Institutions*** may delegate, by agreement, responsibility for actual ***administration***. This does not imply that ***Institutions*** are managers of a hierarchy of managers.
- ***Organization*:**
  An ***Administration*** that controls a set of resources that support, provide, and operate a ***service***, such as an ATN BIS router.
- ***Participant***:
  An ***Administration***, ***Institution***, ***system*** owner, ***system*** operator, or agency that connects and operates an ATN ***system*** in the global, or regional network environment, ATN ***system*** owners or operators.
- ***System*:**
  A union of physical and software elements designed and maintained to perform specific tasks and provide ***service***.
- ***Service*:**
  The overall result achieved from the consolidated interaction of ***applications*,** operational ***administrations***, and physical elements providing support of commerce, and safe and efficient air traffic management. What is provided to users and recipients of ATN systems by the operators and owners of the ATN those ***systems***.

3.0 General Requirements for ATN *Service* Management

Performance of the ATN depends on the effective and efficient exchange of ATN information derived from machine sources as well as the operational procedures and guidelines of those using, operating and maintaining the ATN ***systems***. To properly monitor and maintain the ATN to provide the necessary quality of ***service*** (QoS) general provisions of what is exchanged in what manner and when must be determined and agreed. General requirements for ***service*** management should be defined. There is a minimum set of ***systems*** management requirements which applies to each type of ATN

system (End ***System*** (ES), Boundary Intermediate ***System*** (BIS), Backbone Boundary Intermediate ***System*** (BBIS), Intermediate ***System*** (IS), etc.).

In general:

- ***System*** management events shall be logged locally for subsequent processing report generation and performance requirements.
- ***Systems*** shall have the capability of notifying local ***systems*** of relevant events to ***systems*** management ***subsystems***.
- ***Systems*** shall have the capability to share information among ***domains*** internally and externally to the administrative area.
- ***Systems*** management shall have the capability to manually and automatically configure ATN elements to optimise performance and mitigate failures.
    - This is a local matter for independent ***domains***.
    - Boundary intermediate ***systems*** (BIS) will require some designation of responsibility for configuration, monitoring, and intervention between independent ATN ***systems***.

4.0 Supporting Management and Implementation Agreements

These are agreements developed within and between ATN ***administrations*** that formalize the purpose of ICAO Standards and Recommended Practice concerning ***system*** management in the ATN Global environment.

4.1 ***Service*** Level Agreement (SLA) definition;

- Those documents developed between and internally among ATN ***system*** owners or operators (***domains***) that identify and commit the ATN ***system*** owners or operators to effective and efficient management and operation of the ATN once commissioned. These documents minimally will be bilateral and with the expansion of ATN expected to be multilateral.
- **See Example: Appendix A**

4.2 Memorandum of Agreement (MOA) definition;

- Documents developed between Authorities and other ATN ***system*** owners or operators governing requirements and commitments that promote the efficiency of the ***service*** and provide information necessary to achieve a mutually agreed objective or commitment.
- **See Example: Appendix B**

Recommendation: ATN ***system*** owners and operators shall develop Memorandum of Agreement to support efficient operation and maintenance of deployed and operational ATN elements. Critical points-of-contact and organizational roles and responsibilities should be defined and documented. Equipment should be described and methods of restoration, testing, and coordination clearly described, agreed and documented.

Recommendation: ATN ***system*** owners or operators shall develop and share ***Service*** Level Agreements between independent ***domains***, states, and ***service*** providers to facilitate performance and restoration.
Recommendation: SLA's shall be developed internally within ***domains*** to assure ***domain*** performance supports and makes possible the global ATN.
Recommendation: ***Service*** level agreements (SLA) should depict the ***domain*** responsible for configuration, monitoring, and intervention of shared ***boundary devices*** (routers) utilized by the entire ATN. This does not necessarily designate maintenance or repair responsibility only the operation and configuration in the dynamic in-***service*** environment.

4.3 Technical Memorandum of Cooperation (TMC) definition;

- Documents developed bilaterally, and multilaterally governing the commitment and responsibility of ATN ***system*** owners or operators during the development, implementation, and testing phases of the ATN deployment before operational commissioning. These documents will logically be replaced by SLA's and MOA's governing responsibility after operational integration and commissioning.

Recommendation: States and ***Organization***s that develop and deploy ATN ***systems*** in the Asia Pacific region should develop and publish TMC's that outline their activities and formalize their intent.
Recommendation: Achievements, problems, and lessons learned from activities associated with the TMC should be published and shared among interested parties

5.0 Managing Legacy *Systems*

To meet fully the requirements to provide distributed ***systems*** management across the full range of ATN ***systems*** that comprise the ATN; it is necessary to integrate the management of legacy (proprietary) ***systems***.

Legacy (proprietary) ***systems*** are characterized by their use of management ***systems*** based on non-conformant protocols and interfaces. Obsolescent legacy ***systems*** can fail to conform to ATN standards and practices, but transitionally they require consideration.

6.0 Informational Knowledge Base *System* Management Elements for ATN:

6.1 Information Objects: Objects refer to physical elements such as routers, hubs and switches and also includes administrative information such as telephone numbers, primary offices of responsibility, mailing addresses, and priorities of preemption. Many of these items can be maintained as Informational Objects in the Management Information Base (MIB), and Cross-***Domain*** MIB (CDMIB) of ***system*** management ***application***s. This information can be shared and distributed by cross-***domain*** distribution of Informational Objects.

ATN ***system*** owners or operators responsible for ATN management shall make available to other ATN ***administration***s these informational items.

- Points of Contact
- Offices of responsibility
- Generation of performance reports
- Publication of performance reports
- Distribution of performance reports

Recommendation: Principle and supporting ***Organization***s, businesses, and states should at a minimum gather, retain, and keep current the items identified as Basic Operational Knowledge Base Elements. Availability and currency of these items will facilitate repair, and efficient performance of the ATN ***service***.

7.0 Summary of Recommendations:

Recommendation: ATN ***system*** owners or operators will develop ***Service*** Level Agreements between independent ***domains***, states, and ***service*** providers to facilitate performance and restoration.

Recommendation: SLA's will be developed internally within ***domains*** to assure ***domain*** performance supports and makes possible the global ATN.

Recommendation: ***Service*** level agreements (SLA) should depict the ***domain*** responsible for configuration, monitoring, and intervention of shared ***boundary device***s utilized by the entire ATN. This does not necessarily designate maintenance or repair responsibility only the operation and configuration in the dynamic in-***service*** environment.

Recommendation: States and ***Organization***s that develop and deploy ATN ***systems*** in the Asia Pacific region should develop and publish TMC's that outline their activities and formalize their intent.

Recommendation: Achievements, problems, and lessons learned from activities associated with the TMC should be published and shared among interested parties

Recommendation: Participating states should develop Memorandum of Agreement to support efficient operation and maintenance of deployed and operational ATN elements. Critical points-of-contact and organizational roles and responsibilities should be defined and documented. Equipment should be described and methods of restoration, testing, and coordination clearly described, agreed and documented

Recommendation: Principle and supporting ***Organization***s, businesses, and states should at a minimum gather, retain, and keep current the items identified as Basic Operational Knowledge Base Elements. Availability and currency of these items will facilitate repair, and efficient performance of the ATN ***service***.

8.0. Examples of Management Procedural Agreements.

8.1. Example *Service* Level Agreement

Appendix A

Service level agreement

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***Service* Level Agreement:**

1 Purpose

This agreement is between **ATN LOCATION A and ATN LOCATION B** this document outlines ***service*** level roles, responsibilities, and objectives of **ATN LOCATION A and ATN LOCATION B** in support of the **ATN.**

1 Scope of *services*

Location A and Location B support the day-to-day operations of **ATN** through the maintenance and support of hardware and software elements, objects and ***application***s that comprise the **ATN** and the physical and operational interfaces between **ATN** individual ***domains*** that operate in an interdependent environment.

1.1 Service* offerings include*:

• ***Systems*** Operations	Access to and operation of a network data distribution environment for the ATN, including data handling, switching, routing, message handling, message and information distribution, backup, and recovery
• Backups	Provision for regular backups
• Recovery	All hardware and software problems will be covered by operational management agreements. Data recovery, when required, will be completed in accordance with ATN recommended standards and practices.
• Infrastructure	Shall be maintained and operated in accordance with ATN recommended standards and practices.
• First Level Support	Provisions for operational support of existing ***application*** software, and hardware to facilitate troubleshooting and correction of information management and information distribution problems
• Consulting	Provide expertise to support ATN operation and consult on operational requirements, performance objectives and planning needs

2 Performance goals

Performance guidelines and what are agreed to by the signatories of this agreement that will determine these goals.

3 Performance measures

Performance guidelines and what are agreed to by the signatories of this agreement that will determine these goals.

4 Constraints

Performance guidelines and what are agreed to by the signatories of this agreement that will determine these goals.

5 Maintenance schedules

- Routine posted and shared maintenance schedules
  - Hours of Operation
  - Hours of available technical support
- As scheduled and agreed in advance with affected units

6 Terms of agreement

The signatures of this document indicate agreement to its content, that it is valid, has achievable objectives, and represents the intent of the parties to meet the ***system*** needs, report performance, and achieve cooperative performance goals as identified above. This document is controlled by **Location A, responsible director and Location B, responsible director.** These directors or their duly authorized representatives are the primary signatories of this agreement. Any modifications to this agreement require the review and approval of both parties. Inputs relative to the content or distribution of this document should be forwarded to the director(s).

This document will remain in effect until replaced with an updated version. It will be reviewed annually for currency, accuracy, and completeness. The next review is scheduled for **(Month, day).**

7 Approval

Signature	(Print Name)	Date

Title/Position, ***Organization***, and location.

Signature	(Print Name)	Date

Title/Position, ***Organization***, and location.

8 Addendum A: Technical support availability schedule

Described here times, dates, hours, and offices that supports the operation of the ***service***. Preferred Points of Contact POC's are responsible offices and ***Organization***s rather than individuals.

9 Addendum B: Response and restoration commitments

Agreement between the parties in regard to mutually agreed response and restoration of failed elements or processes. This is the basic commitment of the parties regarding their obligation to respond and restore degraded operations or elements.

10 Addendum C: Critical reports

Described here the performance reports that will be produced by ATN ***system*** owners or operators, frequency, and distribution. How the reports will be delivered, to whom and in what manner, method or form.

11 Addendum D: Performance Measure

Described here the performance measures that the parties mutually agree to apply as a basis to determine effective operation of resources within the local ***administration*** and the resources shared to achieve the global goal.

12 Addendum E: Contact list

A list of hierarchical contacts, timeframes for contact nature of contact, and time to escalate to the next level for action.

8.2. Example Memorandum of Agreement

Appendix B

Organization A
Network Operations Center

And

Organization B
Network Operations Center

Memorandum of Agreement

Operational Procedures
For
ATN Network
Management, Operation, and Maintenance

Month, Day, Year

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1.0 INTRODUCTION

Network management and operation ***services*** between ***Administration A*** and ***Administration B*** Network Operations Center (NOC) whether government, civilian, contractor, vendor, ***service*** provider, or others require coordination, information sharing and clearly defined responsibilities to ensure that ***services*** are effectively transported and maintained to meet user requirements. The recognized criticality regarding delivery of aviation related information insures safety and cost effective operation and the significance is vital. As part of this effort, the following memorandum of agreement outlines and describes the required coordination among the ***administration***s and the responsibilities of each ***administration***.

1.1 Purpose

This document establishes the division of responsibilities and required procedures between ***Administration A*** and ***Administration B*** for the management, operation, and maintenance of information and messages transported between each network. It is understood that any reference to ***Administration A*** or ***Administration B*** in the context of this document, shall include any agent (government, civilian, contractor, vendor, ***service*** provider, and others) designated by the ***Administration***s to act on their behalf for the purpose of fulfilling this agreement.

This document identifies whom, when, and under what conditions allowable actions can be taken. Typical actions include:

- Troubleshooting
- Trouble reporting
- Maintenance actions (preventive, routine scheduled, emergency)
- Division of maintenance authorization
- Coordination of maintenance activities
- Changes to the network
- Configuration of the network
- Failure or non-availability notification
- Monitoring of traffic loading
- ***System*** back-up procedures and the conditions under which they are to be invoked are also established in this document.

The actions described above require the existence of a single point of contact for ***Administration A*** and ***Administration B.*** ***XXXXXX*** shall be the single point of contact for provisioning maintenance and network ***services*** for ***Administration A. XXXXXX. YYYYYY*** shall be the ***Administration B*** single point of contact. ***XXXXXX*** coordinate activities with ***YYYYYY,*** vice-versa.

1.2 Scope

This document will describe the following, as they relate to ***Administration A*** and ***Administration B*** networks:

- Network Overview
- Maintenance and Trouble Reporting
- Network Security and Access
- Technical Assets

1.3 Reference Documents

- ICAO SARP's
- Technical Manuals
- Technical documentation related to the equipment and ***application***s in use by the ATN ***system*** owners or operators

2.0 *Administration* A Network Overview

The ***Administration A*** Network is a ***system*** of leased and owned transmission facilities connecting network equipment resources (Routers, Hubs, Switches, etc.). The network (equipment and telecommunication lines) has a mean time between failure (MTBF) of .9999 or better. The operational management ***system*** is **XXXXX version x.x.** The network is centrally managed at **LOCATION A and Alternate Location B (if provided).**

2.1 Transmission Facilities

The network nodes are linked together with a minimum of two trunks creating a diverse network.

2.2 Clocking Scheme

Clocking for the ***Administration*** A Network is as follows:

- Number of Master Clock Sources.
- Describe how the clocking is distributed.

2.3 Operational *Domains*

In order to maintain operational integrity, ***domain*** separation is implemented between nodes in a particular area or between networks. Firewalls allow seamless communications among the ***domains***, but prevents non-certified, authenticated, or authorized operators from accessing the other ***domains*** within the ATN Network, and total isolation between the ATN and non-ATN networks.

The capability should exist to allow inter-nodal and inter-***domain*** operator and maintenance access. This capability is negotiated between **ATN *Administration*s** and other non-ATN administrators as required supporting mission requirements while maintaining operational integrity concerns.

2.4 Preemption and Priority Scheme

With the use of routing algorithms, the ATN shall always attempt to place a call over a primary path first. A primary path is defined as the shortest route, with the least nodal hops. In the event, the primary path is not available; the network will place the call over an alternate route. Call routing on the ATN will be automatic,

requiring the establishment of a priority and preemption scheme. See Table 1a for the list of ATN priorities.

Table 1a.

ATN Network
Call Priority/Preemption Plan

Service Category	Priority/ Preemption	Types of ***Services***
Lowest priority = 0 Highest priority = n		
1. Critical (.99999 Availability, 6 second restoration)		
Priority 1 (Primary)	13	
Priority 1 (Backup)	12	
Priority 2 (Primary)	11	
Priority 2 (Backup)	10	
Priority 3 (Primary)	9	
Priority 3 (Backup)	8	
2. Essential (.999 Availability, 10 minute restoration)		
	7	
	6	
	5	
	4	
3. Routine (.99 Availability, 1.68 hour restoration)		
	3	
	2	
	1	
4. Network OT&E	0	Testing, temporary evaluation

References:

3.0 *Administration* B Network Overview

The ***Administration B*** Network is a ***system*** of leased and owned transmission facilities connecting network equipment resources (Routers, Hubs, Switches, etc.). The network (equipment and telecommunication lines) has a mean time between failure (MTBF) of .9999 or better. The operational management ***system*** is **XXXXX version x.x.** The network is centrally managed at **LOCATION A and Alternate Location B (if provided).**

3.1 Transmission Facilities

The network nodes are linked together with a minimum of two trunks creating a diverse network.

3.2 Clocking Scheme

Clocking for the ***Administration*** A Network is as follows:

- Number of Master Clock Sources.
- Describe how the clocking is distributed.

3.3 Operational *Domains*

In order to maintain operational integrity, ***domain*** separation is implemented between nodes in a particular area or between networks. Firewalls allow seamless communications among the ***domains***, but prevents non-certified, authenticated, or authorized operators from accessing the other ***domains*** within the ATN Network, and total isolation between the ATN and non-ATN networks.

The capability should exist to allow inter-nodal and inter-***domain*** operator and maintenance access. This capability is negotiated between **ATN *Administration*s** and other non-ATN administrators as required supporting mission requirements while maintaining operational integrity concerns.

3.4 Preemption and Priority Scheme

With the use of routing algorithms, the ATN shall always attempt to place a call over a primary path first. A primary path is defined as the shortest route, with the least nodal hops. In the event, the primary path is not available; the network will place the call over an alternate route. Call routing on the ATN will be automatic, requiring the establishment of a priority and preemption scheme. See Table 1a for the list of ATN priorities.

Table 1a.

ATN Network
Call Priority/Preemption Plan

Service Category	Priority/ Preemption	Types of ***Services***
Lowest priority = 0 Highest priority = n		
1. Critical (.99999 Availability, 6 second restoration)		
Priority 1 (Primary)	13	
Priority 1 (Backup)	12	
Priority 2 (Primary)	11	
Priority 2 (Backup)	10	
Priority 3 (Primary)	9	
Priority 3 (Backup)	8	
2. Essential (.999 Availability, 10 minute restoration)		
	7	
	6	
	5	
	4	
3. Routine (.99 Availability, 1.68 hour restoration)		
	3	
	2	
	1	
4. Network OT&E	0	Testing, temporary evaluation

References:

4.0 *ADMINISTRATION*S AND RESPONSIBILITIES

This section details the guidelines, structure, and duties of individuals and groups of the established ATN Network and ATN ***system*** owners or operators identified in this MOA. Contact person(s) for parties are identified.

4.1 *Administration* A network Operations Mission

Allocations of resources and responsibilities relating to ***services*** of the ATN Network are governed by the following guidelines:

- Simplify the Network operations while accommodating the general Air Traffic Control (ATC) operations and maintenance philosophy.

- Provide high responsiveness to end-users at all locations and central management to eliminate the need for 24-hour, local, on-site operation and maintenance dedication.
- Minimize the time for localization and correlation of failures in end-user equipment or individual transmission ***systems*** attached to the Network with the Network Management ***System*** (NMS) ability to aid in trouble localization.

4.1.1 *Administration* B network Operations Mission

Allocations of resources and responsibilities relating to ***services*** of the ATN Network are governed by the following guidelines:

- Simplify the Network operations while accommodating the general Air Traffic Control (ATC) operations and maintenance philosophy.
- Provide high responsiveness to end-users at all locations and central management to eliminate the need for 24-hour, local, on-site operation and maintenance dedication.
- Minimize the time for localization and correlation of failures in end-user equipment or individual transmission ***systems*** attached to the Network with the Network Management ***System*** (NMS) ability to aid in trouble localization.

4.2 Organizational Structure

This section describes the basic organizational construction of the ATN ***system*** owners or operators, and initial points of contact and offices of responsibility.

4.2.1 *Administration* A Structure

The structure of the ***Administration A's*** Network Management Group is designed to provide maximum response to the end user. The following Network Management ***administration***al structures are described in this section.

- ATN Engineering and Implementation Group
- ATN Configuration Management Group.
- ATN Network Operations Center(s)

4.2.1.1 ATN Engineering and Implementation Group

The ATN Engineering and Implementation Group structure consists of the following:

- International Telecommunications Office
- POC Phone # Office
- Program/Project Office
- POC Phone # Office
- Network Engineering Group
- POC Phone # Office

4.2.1.2 ATN Network Operations Center (NOC)

The ATN NOC structure consists of the following:

- Location A Network Center Manager
  - POC Phone # Office
- Location A Technical POC's
  - POC 1 Phone # Office
  - POC 2 Phone # Office

4.2.2 *Administration* B Structure

The structure of the ***Administration B's*** Network Management and ***Administration*** Groups is designed to provide maximum response to the end user. The following Network Management ***administration***al structures are described in this section.

- ATN Engineering and Implementation Group
- ATN Configuration Management Group
- ATN Network Operations Center(s)

4.2.2.1 ATN Engineering and Implementation Group

The ***Administration B*** Engineering and Implementation Group structure consists of the following:

- Engineering and Development Unit
  - POC 1, Phone #, Organizational Identifier
  - POC 2, Phone #, Organizational Identifier
  - POC n, Phone #, Organizational Identifier

4.2.2.2 ATN Operations POC

The ***Administration B*** Operations POC information is as follows:

- POC 1, Phone #, Organizational Identifier
- POC 2, Phone #, Organizational Identifier
- POC n, Phone #, Organizational Identifier

4.2.2.3 ATN Network Operations Center (NOC)

The ATN NOC structure consists of the following:

- Location B Network Center Manager
  - POC Phone # Office
- Location B Technical POC's
  - POC 1 Phone # Office
  - POC 2 Phone # Office

4.3 Organizational Responsibilities

This section describes the responsibilities of the ***administration***s and personnel involved in the networks. The ***Administration*** *A* NOC ensures that ***service***-related problems are resolved and works directly with the ***Administration*** *B* NOC as necessary.

4.3.1 Network Planning

Network planning is the responsibility of the network engineering group of each network and includes the following:

- Proposing recommendations regarding network configuration changes and increasing or decreasing infrastructure resources.
- Reviewing and recommending new and/or revised Management, Operational, and Maintenance procedures.
- Analyzing regional performance data.
- Providing recommendations for network improvements.

4.3.2 Network Analysis

Network analysis is the responsibility of the network engineering group of each ***administration*** and accomplishes the following:

- Evaluates data from the NOC and the NMS to identify network improvement areas.
- Analyzes reports on network events and usage, and distributes monthly reports via email to all ATN ***system*** owners or operators.
- Provides coordination for all network related activities
- Coordinates with other telecommunications ***service*** managers to ensure optimum performance.
- Examines the communications needs and the expandability of current configurations for integration into the network.
- Determines which circuits and ***services*** to implement on the network.

4.3.3 Network Operations Centers (NOC)

The NOC functionality as described in Section 4.3.2 provides the basic requirements of what is essentially required to operate and maintain a functional and efficient network operation. This basic functionality can be provided by participating states, Civil Aviation Authorities, or contract ***service Organization***s. It is essential that the functionality described herein be provided.

The Network Operations Center is required in order to ensure there is a central focus for network operations. The NOC is made up of network experts at one or more locations and is responsible for internal network operations and ***boundary device system*** elements. The NOC gathers information for future analysis and monitors network performance, security, and integrity.

The NOC is equipped with a Network Management ***System*** (NMS), which provides the network operators the capabilities to monitor performance and availability of the network, and the ability to control and test network elements and circuits as required.

Configuration of user circuits required for transmission to or from the network is coordinated according to procedures stated in this agreement. The NMS provides a real-time view of the network down to the card and port levels of the equipment. The NMS provides fault notification, isolation, and restoration capabilities to the Network Operators

The NOC operates 24 hours a day, 7 days a week with the following responsibilities:

- Provide a single point of contact for the Network
- Provide first-level ***service*** support.
- Perform operations and direct maintenance activities.
- Continuously monitor activities and utilization.
- Monitor and localize network problems.
- Maintain a Trouble Report ***System***.
- Ensure trouble resolution.
- Perform escalation.
- Report trouble status.
- Coordinate with points of contact.
- Coordinate maintenance activities.
- Coordinate ***service*** establishment.
- Implement configurations.
- Maintain logs.
- Manually route traffic, as required, to maintain network operations.
- Provide information for the development of monthly network traffic statistic reports.
- Provide configuration management.

The above bullets are expanded below in Paragraphs 4.3.2.1 through 4.3.2.17

4.3.3.1 Provide a Single Point of Contact for the ATN Network

The NOC is the central point of contact for all network-related issues. The NOC is the single point of contact for issues relating to the ATN Network. Telephone numbers, FAX numbers, and Email addresses for the NOC are provided in Table 1b.

Table 1b.

	TELEPHONE No.	**FAX No.**	**Email Address**
POC 1			
POC 2			
POC 3			
POC n			

4.3.3.2 Provide First-Level *Service* Suppo*rt*

The ATN NOC is the first level of ***service*** support for all ATN Network-related issues. This ***service*** support includes all Network-related equipment problems.

4.3.3.3 Perform Operations and Direct Maintenance Activities

The ATN NOC shall perform operations and coordinates the maintenance activities for the Network and all associated equipment with users that will be affected. The performance of operations and the direction of the maintenance activities will ensure that the ATN Network is as efficient as possible.

4.3.3.4 Continuously Monitor Activities and Utilization

The ATN NOC shall continuously monitor the utilization of the ATN Network and its related equipment. The NOC shall ensure that all ATN Network ***services*** are performing properly and all trunks are operating within specifications. The NOC also monitors all logged-on user activities.

4.3.3.5 Monitor and Localize Network Problems

The ATN NOC shall monitor the network for any trouble. Adjacent networks will assist in troubleshooting performance issues. Trouble(s) shall be localized and maintenance shall be coordinated where appropriate. Direction of maintenance will include calling the points of contact and the ***service*** providers.

4.3.3.6` Maintain the Trouble Report *System*

The ATN NOC shall maintain the trouble report ***system*** by recording network impairments reported by users or identified through the NMS. The NOC will ensure that trouble tickets are initiated properly, that the information is continuously updated, and the trouble tickets are properly closed. Once the trouble tickets have been closed, the NOC will notify all concerned parties of their resolution. Trouble reports shall be shared as required.

4.3.3.7 Ensure Trouble Resolution

The ATN NOC shall ensure that all identified troubles are resolved.

4.3.3.8 Perform Escalation

The ATN NOC shall perform all escalation procedures necessary for the resolution of network troubles

4.3.3.9 Report Trouble Status

The ATN NOC shall provide status reports of troubles reported to them relating to other points of contact in accordance with agreed schedules. For priority 1 troubles, the NOC, as well as all affected users, will be notified automatically when the trouble is detected, and again when the trouble is repaired and ***service*** restored.

4.3.3.10 Coordinate with Points of Contact

The ATN NOC shall coordinate with the proper points of contact for trouble resolution. The user points of contact shall contact the ATN NOC (as appropriate) as soon as network troubles are experienced.

4.3.3.11 Coordinate Maintenance Activities

The ATN NOC shall coordinate all ATN Network-related maintenance activities. These activities include preventive, routine, and emergency maintenance. The NOC shall initiate all requests for maintenance time periods, will ensure that all affected network sites are aware of the requests, and will ensure maintenance is completed.

4.3.3.12 Coordinate *Service* Establishment

The ATN NOC, in cooperation with the AFL POC, shall coordinate the establishment of all related inter-network ***services***. The ATN NOC will ensure that the ***service*** is operational and will update all their databases.

4.3.3.13 Implement Configurations

The NOC shall implement configurations as required. Coordination with users potentially impacted shall be done prior to any changes.

4.3.3.14 Maintain the Log

The ATN NOC shall maintain a log of all Network-related queries, by telephone, E-mail, or any other contact, unless a trouble ticket is generated. This information will be made available to those that require it once a request has been received.

4.3.3.15 Manually Route Traffic

The NOC shall manually route traffic, as required, to better utilize or to place traffic on a preferred path. This will be done only on a case-by-case basis, and in concert with affected users whenever possible.

4.3.3.16 Provide Monthly Network Traffic Statistic Reports

The ATN NOC shall provide monthly reports of ATN's BWM Network traffic statistics to users that need the information and have submitted a request. These reports are to be used to ensure that there is adequate bandwidth in the network.

4.3.3.17 Provide Configuration Management

To preserve the integrity of the ATN BWM Network, changes to hardware, software, or operational procedures shall first be presented in proposal form to the Engineering group at least 30 days in advance of the proposed implementation date. This will ensure that their impact on the network can be ascertained. Differences regarding the implementation of the proposed changes will be subject to negotiation between the ATN ***system*** owners or operators.

4.4 Specific Responsibilities for *Administration* A and *Administration* B POC's

4.4.1 ATN NOC

The ATN NOC is responsible for all activities relating to the network elements in their ***domain*** and all circuits that are connected to that network. They are also responsible for coordinating with other networks and users for problem resolution.

5.0 MAINTENANCE OBJECTIVES

A maintenance plan is critical to the successful operation of the ATN Network. This section describes the objectives, procedures, and priorities for maintaining the ATN Network. The maintenance objectives of the ATN Network are to accomplish the following:

- Provide a single point of contact for maintenance
- Control trouble localization from one point
- Provide procedures for maintenance activities
- Set priorities for accomplishing maintenance

The NOC is equipped with a Network Management ***System*** (NMS) that provides monitoring and control points for the network. The NMS provides a complete, real-time view of the network down to the trunk and ports. The NMS provides fault notification, isolation, and restoration capabilities to the BWM Network Operator. The NMS allows alarms to be prioritized to network severity and provides thresholds to meet the operational needs of the network.

The NOC has the primary responsibility for initiating, coordinating, and escalating the maintenance activities. It is the single point of contact for provisioning maintenance ***services***. The NOC is available 24 hours a day, 7 days a week.

5.1 Trouble Reporting

The network monitoring functions will alarm for events that happen on the ATN Network. However, any user of the Network, at the first sign of abnormal or unsatisfactory operations, should contact their responsible NOC.

5.2 Logging Calls

All informational and trouble calls related to the ATN Network shall be entered into the daily logs maintained at the NOC. All calls relating to unsatisfactory operation of the Network shall be entered into the daily log and, monthly reports will be prepared for exchange between ATN ***system*** owners or operators. The method of exchange shall be via e-mail, fax, or telephone, as appropriate.

The NOC has an automated trouble ticket ***system*** that provides a speedy and organized response to ***service*** disruption on the network.

5.3 Maintenance Priorities

5.3.1 ATN Maintenance Priorities

ATN ***system*** owners or operators as shown below will perform maintenance on a priority basis. Table 5-1 provides the action to be taken for each priority level.

Priority 1:

- Loss of critical ***service*** (critical user or trunk ***service***)
- Loss of 50 percent or more of the ***service*** at one location
- Failure of the NMS to function correctly.

Priority 2:

- Loss of essential ***service***
- Inability to clear alarms after troubles cease.

Priority 3:

- Troubles identified by trend analysis not covered in Priorities 1 or 2
- Single-incident quality trouble

Priority 4

- Request for monitoring
- Request for research

5.3.1.1 Repair Status

Reporting time for status of trouble calls shall be based on priority shown in Table 5-1. All clearances on the trouble calls associated with Table 5-1 shall be within 4 hours from escalation. Trouble reports on all non-cleared ***service***-affecting faults should be exchanged among network managers on an hourly (at a minimum) basis until the fault is cleared. Trouble reports on all other non-***service***-affecting faults should be exchanged among network managers at four (4) hour intervals.

Table 5-1 Reporting Time for Trouble Calls

Priority[1]	**Action**
1	Within 30 minutes Every 30 minutes thereafter
2	Within 1 hour Every 1 hour thereafter
3	Within 4 hours Daily status update will be given
4	Within 24 hours Daily status update will be give

NOTE 1: The Priority definitions are identified in paragraph 5.3.1.

5.3.1.2 Escalation

The NOC shall perform escalations as necessary in concert with other networks and users affected. Faults detected and isolated will be escalated after the elapsed time exceeds twice the initial response time in according to the levels shown in Table 5-1. Points of Contact for the escalation process are listed in Appendix 2. Further, all faults detected will be relayed to the respective network managers as follows:

- All ***system*** faults within 1 hour from detection
- All major trunk faults within 30 minutes from detection

Standard escalation procedures will require trouble tickets to be escalated according to the following levels:

Table 5-2. Standard Escalation Levels

Level	Standard Escalation Levels
First	NOC
Second	NOC Supervisor
Third	TBD
Fourth	TBD
Fifth	TBD

5.3.1.3 Back-up Procedures in the Event of a Total Node Failure

Back-up procedures shall be in accordance with those outlined in the contingency plans for the facility.

5.3.1.4 Node-to-Node Trunk Failures

In case of node-to-node trunk failure, all network traffic shall be automatically re-routed and restored by the Network to the non-failed trunk within four (4) to six (6) seconds of failure detection. Bandwidth contention shall be resolved via a preempt/priority scheme to assure delivery of the highest priority messages.

If there is insufficient bandwidth available to re-route the traffic without interrupting other ***service***, bandwidth shall be made available automatically based on the priority ***services*** in accordance with the pre-empt priority scheme, to be considered at a later date, until the trunk becomes available again.

5.4 Configuration Changes

Whenever a configuration change is made to a primary ATN/AMHS element, the configuration of any standby element must also be updated.
Configuration that may effect other ATN ***system*** owners or operators must be communicated and shared between ATN ***system*** owners or operators.

6.0 TECHNICAL ASSETS

To assist with the operation and maintenance of the ATN Network, the following tools should be available:

- Network Management ***System*** (NMS)
- Trouble Management ***System*** (TMS) with Trouble Ticket Tools
- Standard Network Test Equipment that is already in the inventory
- Reports

6.1 Network Management *System* (NMS)

The NOC uses a Network Management ***System*** (NMS) to monitor the health and status of the elements and devices installed in the network. The NMS provides a graphical user interface that incorporates all elements of the Network into a user-friendly platform that provides clear access to the operational status of the network.

The workstation gives the NMS operators a graphical display of each Network. The NMS will constantly monitor the operational status of the network and provide real time display updates. Operational updates include changes to ***system*** alarms and failures as well as changes in configuration.

In case of a performance degradation, or loss of a trunk or an entire site, the Network will automatically switch to a different trunk to go around the effected element, independent of the NMS. The loss of an NMS will not affect the operation of the Network; the Network will operate independently of the NMS.

6.2 Trouble Management *System*

The Trouble Management ***System*** (TMS), which includes a Trouble Ticket Tool, is an automated trouble ticket handling ***system*** with a centralized database. The NOC uses the TMS for efficient and timely trouble handling. The NOC records certain information obtained from the user into the TMS. This information includes:

- The name and callback number of the individual reporting the trouble
- Contact name and number at the trouble site location
- Network circuit or channel number
- Failed device or element
- Time of initial degradation or ***service*** disruption
- Description of ***service*** impairment and current status
- Release for circuit testing

All entries made in a TMS trouble ticket are required to be computer stamped with the date, time, and initials of the operator making the update. TMS shall play a major role in trouble handling by providing a means to:

- Record Network impairments reported by users or identified through the NMS.
- Assign the proper priority and trouble codes for timely resolution of the impairment.
- Refer the reported impairment to the appropriate Network operations location for resolution.

- Provide regional central points where corrective actions can be progressively followed and resolution status is maintained.
- Provide a computerized database of trouble histories for trend analysis.

6.3 Network Testing

Because of the disruptive nature of network testing, the Network operators and users shall employ stringent coordination procedures prior to initiating network tests.

6.3.1 Standard Test Equipment

No unique test equipment will be required to maintain the ATN Network.

7.0 AGREEMENT

This agreement constitutes the entire Agreement between the parties and supersedes all previous statements or representations, whether oral or written, with respect to the subject matter of the Agreement. Any change or modification must be in writing and signed by duly authorized representatives or both parties hereto.

6.1 *Authority*

WITNESS that the parties have read this Agreement, including the attached schedules, and agree to be bound by its terms and have therefore caused this agreement to be executed by their duly authorized representative as set forth below.

***Administration* A**	***Administration* B**
By: _____	By: _____
Printed Name: _____	Printed Name: _____
Title: _____	Title: _____
Date: _____	Date: _____
Witness: _____	Witness: _____
Printed Name: _____	Printed Name: _____
Date: _____	Date: _____
_____	_____
Company Stamp	Company Stamp

APPENDIX 1: Points of Contact

Location	POC	Telephone No.	FAX No.	Email Address

APPENDIX 2: Escalation Level POCs

***Administration* A Escalation Level POCs**

	Location	POC	Telephone No.	FAX No.	Email Address
1					
2					
3					

***Administration* B Escalation Level POCs**

	Location	POC	Telephone No.	FAX No.	Email Address
1					
2					
3					

TABLE CNS-1D

ATS INTER-FACILITY DATA COMMUNICATION (AIDC)

IMPLEMENTATION PLAN

Explanation of the Table

Column

1 Administration – the name of the Administration, State or Organization responsible for management of the AIDC;

2 Location of AIDC end system – the location of the AIDC end system under the supervision of Administration identified in column 1;

3 AIDC Pair – the correspondent AIDC end system;

Location – location of the correspondent AIDC end system

Administration – the name of the administration, State or Organization responsible for management of the correspondent AIDC end system

4 AIDC standard used – the AIDC standard adopted for the AIDC connection between the corresponding AIDC pair, AFTN/AMHS or ATN;

5 Target Date of Implementation – date of implementation of the AIDC end system;

6 Remarks – any additional information describing the AIDC end system or the AIDC service between the corresponding AIDC pair.

TABLE CNS-1D **Appendix E to the Report**

ATS INTERFACILITY DATA COMMUNICATION (AIDC) ROUTING PLAN

Administration	Location of AIDC end system	AIDC Pair		AIDC standard used	Target date of Implementation	Remarks
		Correspondent location	Correspondent Administration			
1	2	3		4	5	6
Australia						
Bangladesh						
Bhutan						
Brunei Darussalam						
Cambodia						
China						
Hong Kong, China						
Macao, China						
Cook Islands						
Democratic People's Republic of Korea						
Fiji						
India						
Indonesia	Jakarta		Australia			
			Singapore			
	Makassar		Australia			
Japan						
Kiribati						
Lao People's Democratic Republic						
Malaysia						
Maldives						
Marshall Islands						

TABLE CNS-1D **Appendix E to the Report**

ATS INTERFACILITY DATA COMMUNICATION (AIDC) ROUTING PLAN

Administration	Location of AIDC end system	AIDC Pair		AIDC standard used	Target date of Implementation	Remarks
		Correspondent location	Correspondent Administration			
1	2	3		4	5	6
Micronesia (Federated States of)						
Mongolia						
Myanmar						
Nauru						
Nepal						
New Zealand						
Palau						
Papua New Guinea						
Philippines						
Republic of Korea						
Samoa						
Singapore						
Solomon Islands						
Sri Lanka						
Thailand	Bangkok	Phnom Penh	Cambodia	ATN	2005	
		Vientiane	Laos	ATN	2005	
		Kuala Lumpur	Malaysia	ATN	2005	
		Yangon	Myanmar	ATN	2005	
		Hochiminh	Viet Nam	ATN	2005	
Tonga						
Vanuatu						
Viet Nam						

TABLE CNS-1C
ATS MESSAGE HANDLING SERVICE (ATSMHS)
IMPLEMENTATION PLAN

Explanation of the Table

Column	
1	Administration – the name of the Administration, State or Organization responsible for management of the facility
2	Location of Facility
3	Facility Type: AMHS UA (Location of AMHS)
4	Target Date of Implementation – date of implementation of the ATSMHS
5	Remarks

AMHS – ATS Message Handling System which may include Message Transfer Agents and AFTN/AMHS gateways services.

TABLE CNS-1C ATS MESSAGE HANDLING SERVICE (ATSMHS) IMPLEMENTATION PLAN

Administration	Location of Facility	Facility Type	Target Date of Implementation	Remarks
American Samoa	Pago Pago	UA (Salt Lake City)	2005	
Australia	Brisbane	AMHS	2006	
Bangladesh	Dhaka	AMHS	2005	
Bhutan	Paro	UA (Mumbai)	2008	
Brunei Darussalam	Brunei	AMHS	2006	
Cambodia	Phnom Penh	AMHS	2005	
China	Beijing	AMHS	2005	
	Taibei	AMHS	2005	
Hong Kong, China	Hong Kong	AMHS	2005	
Macau, China	Macau	AMHS	2005	
Cook Island	Rarotonga	UA (Christchurch)	2006	
Timor Leste	Dili	UA (Brisbane)	2006	Under construction
DPR Korea	Pyongyang	AMHS	2005	
Fiji	Nadi	AMHS	2005	
French Polynesia	Papeete	UA (Christchurch)	2006	
India	Mumbai	AMHS	2005	
Indonesia	Jakarta	AMHS	2006	
	Ujung Pandang	AMHS	2006	
Japan	Tokyo	AMHS	2004	
Kiribati	Tarawa	UA (Nadi)	2005	
Lao PDR	Vientiane	AMHS	2005	

TABLE CNS-1C ATS MESSAGE HANDLING SERVICE (ATSMHS) IMPLEMENTATION PLAN

Administration	Location of Facility	Facility Type	Target Date of Implementation	Remarks
Malaysia	Kuala Lumpur	AMHS	2005	
Maldives	Male	AMHS	2005	
Marshall Island	Majuro	UA (Salt Lake City)	2005	
Micronesia Federated State of	Chuuk	UA (Salt Lake City)	2005	
	Kosrai	UA (Salt Lake City)	2005	
	Ponapei	UA (Salt Lake City)	2005	
	Yap	UA (Salt Lake City)	2005	
Mongolia	Ulaanbaatar	AMHS	2006	
Myanmar	Yangon	AMHS	2005	
Nauru	Nauru	UA (Brisbane)	2006	
Nepal	Kathmandu	AMHS	2005	
New Caledonia	Noumea	UA (Nadi)	2005	
New Zealand	Christchurch	AMHS	2006	
Niue Is	Niue	UA (Christchurch)	2006	
Pakistan	Karachi	AMHS	2006	
Palau	Koror	UA (Salt Lake City)	2005	
Papua New Guinea	Port Moresby	UA (Brisbane)	2006	
Philippines	Manila	AMHS	2005	
Republic of Korea	Seoul	AMHS	2005	
Samoa	Faleolo	UA (Christchurch)	2006	
Singapore	Singapore	AMHS	2005	

TABLE CNS-1C ATS MESSAGE HANDLING SERVICE (ATSMHS) IMPLEMENTATION PLAN

Administration	Location of Facility	Facility Type	Target Date of Implementation	Remarks
Solomon Is	Honiara	UA (Brisbane)	2006	
Sri Lanka	Colombo	AMHS	2005	
Thailand	Bangkok	AMHS	2005	
Timor Leste	Dili	UA (Brisbane)	2006	
Tonga	Tongatapu	UA (Christchurch)	2006	
Tuvalu	Funafuti	UA (Nadi)	2005	
United States	Salt Lake City	AMHS	2004	
Vanuatu	Port Vila	UA (Brisbane)	2006	
Viet Nam	Hanoi	AMHS	2005	
Wallis Is.	Wallis	UA (Nadi)	2005	

Appendix G to the Report

TABLE CNS 1B – ATN ROUTER PLAN

Explanation of the Table

Column

1	Administration – the name of the Administration, State or Organization responsible for management of the router
2	Location of Router
3	Type of Router: BBIS - Backbone Boundary Intermediate System BIS - Boundary Intermediate System
4	Type of Interconnection: Inter – Regional Intra – Regional Sub – Regional
5	Interconnection, Connected to router of: name of the location of the correspondent router
6	Link Speed – Speed requirements of the interconnecting link
7	Link Protocol – Protocol requirements for the interconnecting link
8	Target Date of Implementation – date of implementation of the router
9	Remarks

TABLE CNS-1B – ATN ROUTER PLAN

Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
American Samoa	Pago Pago			United States	9600bps	X.25		Intra-domain
Australia	Brisbane			Timor Leste	9600 bps	X.25		Intra-domain
		BBIS	Sub-Regional	Fiji	19200 bps	X.25	2006	
		BIS	Sub-Regional	Indonesia	9600bps	X.25	2006	
		BBIS	Intra-Regional	Japan	64000bps	X.25	2007	
				Nauru	9600bps	X.25		Intra-domain
		BIS	Sub-Regional	New Zealand	9600bps	X.25	2006	
				Papua New Guinea	9600bps	X.25		Intra-domain
		BBIS	Intra-Regional	Singapore	64000bps	X.25	2006	
				Solomon Islands	9600bps	X.25		Intra-domain
		BBIS	Inter-Regional	United States	64000bps	X.25	2006	
				Vanuatu	9600bps	X.25		Intra-domain
Bangladesh	Dhaka	BIS	Sub-Regional	India	9600bps	X.25	2005	
		BIS	Sub-Regional	Thailand	9600bps	X.25	2005	
Bhutan	Paro	BIS	Sub-Regional	India	9600bps	X.25	2008	

Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
Brunei Darussalam	Brunei	BIS	Sub-Regional	Malaysia	9600bps	X.25	2006	
		BIS	Sub-Regional	Singapore	9600bps	X.25	2006	
Cambodia	Phnom Penh	BIS	Sub-Regional	Thailand	9600bps	X.25	2005	
China	Beijing	BIS	Sub-Regional	DPR Korea	9600bps	X.25	2005	
		BBIS	Intra-Regional	Hong Kong, China	64000bps	X.25	2005	
		BBIS	Intra-Regional	India	64000bps	X.25	2005	
		BBIS	Intra-Regional	Japan	64000bps	X.25	2005	
		BIS	Sub-Regional	Macau, China	9600bps	X.25	2005	
		BIS	Sub-Regional	Mongolia	9600bps	X.25	2005	
		BIS	Sub-Regional	Myanmar	9600bps	X.25	2005	
		BIS	Sub-Regional	Nepal	9600bps	X.25	2005	
		BIS	Sub-Regional	Pakistan	9600bps	X.25	2006	
		BIS	Sub-Regional	Republic of Korea	9600bps	X.25	2005	
		BBIS	Inter-Regional	Russian Federation	19200bps	X.25	2005	
		BIS	Sub-Regional	Taibei	9600bps	X.25	2005	
		BBIS	Intra-Regional	Thailand	64000bps	X.25	2005	
	Taibei	BIS	Sub-Regional	Hong Kong, China	9600bps	X.25	2005	
		BIS	Sub-Regional	Japan	9600bps	X.25	2007	

Appendix G to the Report

Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
Hong Kong, China	Hong Kong	BBIS	Intra-Regional	China	64000bps	X.25	2005	
		BIS	Sub-Regional	Macau, China	9600bps	X.25	2005	
		BBIS	Intra-Regional	Japan	64000bps	X.25	2005	
		BIS	Sub-Regional	Philippines	9600bps	X.25	2005	
		BIS	Sub-Regional	Taibei	9600bps	X.25	2005	
		BBIS	Intra-Regional	Thailand	64000bps	X.25	2004	
		BIS	Sub-Regional	Viet Nam	9600bps	X.25	2005	
Macau, China	Macau	BIS	Sub-Regional	China	9600bps	X.25	2005	
		BIS	Sub-Regional	Hong Kong, China	9600bps	X.25	2005	
Cook Islands	Rarotonga			New Zealand	9600bps	X.25		Intra-domain
DPR Korea	Pyongyang	BIS	Sub-Regional	China	9600bps	X.25	2005	
Fiji	Nadi	BBIS	Intra-Regional	Australia	19200 bps	X.25	2006	
		BIS	Sub-Regional	Kiribati	9600bps	X.25	2006	
		BIS	Sub-Regional	New Caledonia	9600bps	X.25	2006	
		BIS	Sub-Regional	Tuvalu	9600bps	X.25	2006	
		BBIS	Inter-Regional	United States	19200 bps	X.25	2005	
		BIS	Sub-Regional	Wallis Islands	9600bps	X.25	2006	
		BIS	Sub-Regional	New Zealand	9600 bps	X.25	2006	

Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
French Polynesia	Papeete			New Zealand	9600bps	X.25		Intra-domain
India	Mumbai	BIS	Sub-Regional	Bangladesh	9600bps	X.25	2005	
		BIS	Sub-Regional	Bhutan	9600bps	X.25	2008	
		BBIS	Intra-Regional	China	64000bps	X.25	2005	
		BBIS	Inter-Regional	Kenya	19200bps	X.25	2005	
		BIS	Sub-Regional	Nepal	9600bps	X.25	2005	
		BBIS	Inter-Regional	Oman	19200bps	X.25	2005	
		BIS	Sub-Regional	Pakistan	9600bps	X.25	2006	
		BBIS	Intra-Regional	Singapore	64000bps	X.25	2005	
		BIS	Sub-Regional	Sri Lanka	9600bps	X.25	2005	
		BBIS	Intra-Regional	Thailand	64000bps	X.25	2005	
Indonesia	Jakarta	BIS	Sub-Regional	Australia	9600bps	X.25	2006	
		BIS	Sub-Regional	Singapore	9600bps	X.25	2005	
Japan	Tokyo	BBIS	Intra-Regional	Australia	64000bps	X.25	2006	
		BBIS	Intra-Regional	China	64000bps	X.25	2005	
		BBIS	Intra-Regional	Hong Kong, China	64000bps	X.25	2005	
		BBIS	Inter-Regional	Europe	64000bps	X.25	2005	
		BIS	Sub-Regional	Republic of Korea	9600bps	X.25	2005	

Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
Japan (Cont'd)	Tokyo	BBIS	Inter-Regional	Russia Federation	64000bps	X.25	2005	
		BBIS	Intra-Regional	Singapore	64000bps	X.25	2005	
		BIS	Sub-Regional	Taibei	9600bps	X.25	2007	
		BBIS	Inter-Regional	United States	64000bps	X.25	2004	
Kiribati	Tarawa	BIS	Sub-Regional	Fiji	9600bps	X.25	2005	
Lao PDR	Vientiane	BIS	Sub-Regional	Thailand	9600bps	X.25	2005	
		BIS	Sub-Regional	Viet Nam	9600bps	X.25	2005	
Malaysia	Kuala Lumpur	BIS	Sub-Regional	Brunei	9600bps	X.25	2006	
		BIS	Sub-Regional	Singapore	9600bps	X.25	2005	
		BIS	Sub-Regional	Thailand	9600bps	X.25	2005	
Maldives	Male	BIS	Sub-Regional	Sri Lanka	9600bps	X.25	2005	
Marshall Islands	Majuro			United States	9600bps	X.25		Intra-domain
Micronesia Federated State of	Chuuk			United States	9600bps	X.25		Intra-domain
	Kosrae			United States	9600bps	X.25		Intra-domain
	Ponapei			United States	9600bps	X.25		Intra-domain
	Yap			United States	9600bps	X.25		Intra-domain
Mongolia	Ulaanbaatar	BIS	Sub-Regional	China	9600bps	X.25	2005	

Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
Myanmar	Yangon	BIS	Sub-Regional	China	9600bps	X.25	2005	
		BIS	Sub-Regional	Thailand	9600bps	X.25	2005	
Nauru	Nauru			Australia	9600bps	X.25		Intra-domain
Nepal	Kathmandu	BIS	Sub-Regional	China	9600bps	X.25	2005	
		BIS	Sub-Regional	India	9600bps	X.25	2005	
New Caledonia	Noumea	BIS	Sub-Regional	Fiji	9600bps	X.25	2005	
New Zealand	Christchurch	BIS	Sub-Regional	Australia	9600bps	X.25	2006	
				Cook Is	9600bps	X.25		Intra-domain
		BIS	Sub-Regional	Fiji	9600bps	X.25	2006	
				French Polynesia	9600bps	X.25		Intra-domain
				Niue	9600bps	X.25		Intra-domain
				Samoa	9600bps	X.25		Intra-domain
				Tonga	9600bps	X.25		Intra-domain
Niue Islands	Niue			New Zealand	9600bps	X.25		Intra-domain
Pakistan	Karachi	BIS	Sub-Regional	China	9600bps	X.25	2006	
		BIS	Sub-Regional	India	9600bps	X.25	2006	
Palau	Koror			United States	9600bps	X.25		Intra-domain
Papua New Guinea	Port Moresby			Australia	9600bps	X.25		Intra-domain

Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
Philippines	Manila	BIS	Sub-Regional	Hong Kong, China	9600bps	X.25	2005	
		BIS	Sub-Regional	Singapore	9600bps	X.25	2005	
Republic of Korea	Seoul	BIS	Sub-Regional	China	9600bps	X.25	2005	
		BIS	Sub-Regional	Japan	9600bps	X.25	2005	
Samoa	Faleolo			New Zealand	9600 bps	X.25		Intra-domain
Singapore	Singapore	BBIS	Intra-Regional	Australia	64000bps	X.25	2006	
		BBIS	Inter-Regional	Bahrain	64000 bps	X.25	2005	
		BIS	Sub-Regional	Brunei	9600bps	X.25	2006	
		BBIS	Intra-Regional	India	64000bps	X.25	2005	
		BIS	Sub-Regional	Indonesia	9600bps	X.25	2005	
		BBIS	Intra-Regional	Japan	64000bps	X.25	2005	
		BIS	Sub-Regional	Malaysia	9600bps	X.25	2005	
		BIS	Sub-Regional	Philippines	9600bps	X.25	2005	
		BIS	Sub-Regional	Sri Lanka	9600bps	X.25	2005	
		BBIS	Intra-Regional	Thailand	64000bps	X.25	2005	
		BBIS	Inter-Regional	United Kingdom	64000 bps	X.25	2005	
		BIS	Sub-Regional	Viet Nam	9600bps	X.25	2005	
Solomon Islands	Honiara			Australia	9600bps	X.25		Intra-Domain

Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
Sri Lanka	Colombo	BIS	Sub-Regional	India	64000 bps	X.25	2005	
		BIS	Sub-Regional	Maldives	9600bps	X.25	2005	
		BIS	Sub-Regional	Singapore	9600bps	X.25	2005	
Thailand	Bangkok	BIS	Sub-Regional	Bangladesh	9600bps	X.25	2005	
		BIS	Sub-Regional	Cambodia	9600bps	X.25	2005	
		BBIS	Intra-Regional	China	64000bps	X.25	2005	
		BBIS	Intra-Regional	Hong Kong, China	64000bps	X.25	2004	
		BBIS	Intra-Regional	India	64000bps	X.25	2005	
		BBIS	Inter-Regional	Italy	19200bps	X.25	2005	
		BIS	Sub-Regional	Lao PDR	9600bps	X.25	2005	
		BIS	Sub-Regional	Malaysia	9600bps	X.25	2005	
		BIS	Sub-Regional	Myanmar	9600bps	X.25	2005	
		BBIS	Intra-Regional	Singapore	64000bps	X.25	2005	
		BIS	Sub-Regional	Viet Nam	9600bps	X.25	2005	
Timor Leste	Dili			Australia	9600bps	X.25		Intra-domain
Tonga	Tongatapu			New Zealand	9600bps	X.25		Intra-domain
Tuvalu	Funafuti	BIS	Sub-Regional	Fiji	9600bps	X.25	2005	
United States	Salt Lake City			American Samoa	9600bps	X.25		Intra-domain

Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
United States (Cont'd)	Salt Lake City	BBIS	Inter-Regional	Australia	64000 bps	X.25	2005	
		BBIS	Inter-Regional	Fiji	19200 bps	X.25	2005	
		BBIS	Inter-Regional	Japan	64000bps	X.25	2004	
				Marshall Islands	9600bps	X.25		Intra-domain
				Micronesia, Federated State of	9600bps	X.25		Intra-domain
				Palau	9600bps	X.25		Intra-domain
Vanuatu	Port Vila			Australia	9600bps	X.25		Intra-domain
Viet Nam	Hanoi	BIS	Sub-Regional	Hong Kong, China	9600bps	X.25	2005	
		BIS	Sub-Regional	Lao PDR	9600bps	X.25	2005	
		BIS	Sub-Regional	Singapore	9600bps	X.25	2005	
		BIS	Sub-Regional	Thailand	9600bps	X.25	2005	
Wallis Islands	Wallis	BIS	Sub-Regional	Fiji	9600bps	X.25	2005	

TABLE CNS-1A - AFTN PLAN

Explanation of the Table

Column

1 The AFS station or facility of individual State, listed alphabetically. Each circuit appears twice in the Table.

2 Category of circuit

- M - Main trunk circuit connecting Main AFTN communication centres.
- T - Tributary circuit connecting Main AFTN communication centre and AFTN stations to relay or retransmit AFTN traffic.
- S - AFTN circuit which is used to transmit and receive AFTN traffic to and from a Main or Tributary AFTN communication centre directly connected to it and does not relay AFTN traffic except for the purpose of serving national station(s).

3 and 7 Type of circuit provided:

HF RTT	High frequency radio teletype
LTT	landline teletypewriter
LTT/a	landline teletypewriter, analogue (eg. cable, microwave)
LTT/d	landline teletypewriter, digital (eg. cable, microwave)
LDD/a	landline data circuit, analogue (eg. cable, microwave)
LDD/d	landline data circuit, digital (eg. cable, microwave)
SAT/n/a/d	satellite link, the number indicates the number of hubs in the circuit: Also use/a for analogue or/d for digital appropriate to the tail circuit.

4 and 8 Circuit signalling speed, current or planned.

5 and 9 Circuit protocols, current or planned.

COP-B	Character oriented data link control procedure – System Category - B
X. 25	X.25 protocol

6 and 10 Data transfer code (syntax), current or planned.

ITA-2	International Telegraph Alphabet No. 2 (Baudot code)
IA-5	International Alphabet No. 5 (7 - unit code)

11 Target date of implementation

12 Remarks

Note 1: Circuit is required for alternate routing and for national routing for international traffic.

Note 2: Requirements exist for speech and data (S + DX) communication.

State/Station	Cat.	CURRENT				PLANNED				Target date of implemen-tation	Remarks
		Type	Signalling Speed	Protocol	Code	Type	Signalling Speed	Protocol	Code		
1	2	3	4	5	6	7	8	9	10	11	12
AMERICAN SAMOA											
PAGO PAGO - S/NSTU											
United States/KSLC	S	LDD/d	2400 bps	X.25	IA-5						
AUSTRALIA											
BRISBANE - M/YBBB											
Christchurch/NZCH	T	LDD/d	2400 bps	X.25	IA-5						Note 2
Honiara/AGGC	S					LTT	75 baud	None	IA-5		Internet as interim measure
Jakarta/WIII	S	SAT/d	9600 bps	X.25	IA-5						Note 1,2
Nadi/NFFN	M	LDD/d	2400 bps	X.25	IA-5						Note 2
Nauru/ANAU	S					SAT/d	2400 bps	X.25	IA-5		Internet as interim measure
Port Moresby/AYPM	S	SAT/d	9600 bps	X.25	IA-5						Note 2
Port Vila/NVVV	S	LTT	300 baud	None	ITA-2						Internet as interim measure
Santiago/SCSC	M					LDD/d	2400 bps	X.25	IA-5	12/05	Current routing via USA
Singapore/WSSS	M	LDD/d	2400 bps	X.25	IA-5						
United States/KSLC	M	SAT/d	2400 bps	X.25	IA-5						
Johannesburg	M	SAT/d	64 Kbps	X.25	IA-5						
BANGLADESH											
DHAKA - S/VGZR											
Bangkok/VTBB	S	SAT/d	300 baud	None	IA-5						
Kolkata/VECC	S	LDD/d	64 Kbps	X.25	IA-5						
BHUTAN											
PARO - S/VQPR											
Mumbai/VABB	S	SAT/a	300 baud	None	ITA-2						Dial-up, Trial operation
BRUNEI DARUSSALAM											
BRUNEI - S/WBSB											
Singapore/WSSS	S	LDD/d	4800 bps	X.25	IA-5						
Kuala Lumpur/WMKK	S	LTT	2400 bps	None	IAT-2	LDD/d	9600 bps	X.25	IA-5	12/05	Note 1,2
CAMBODIA											
PHNOM PENH - S/VDPP											
Bangkok/VTBB	S	SAT/d	300 baud	None	IA-5						Note 2
CHINA											
BEIJING - M/ZBBB											
Guangzhou/ZGGG	S	LDD/d	9600 bps	X.25	IA-5						
Karachi/OPKC	M	LTT	50 baud	None	ITA-2	LDD/a		None	IA-5	12/04	
Kathmandu/VNKT	S	SAT/d	300 baud	None	IA-5						
Russian Fedration/UHHH	M	SAT/d	2400 bps	None	IA-5						(Khabarovsk)
Pyongyang/ZKKK	S	SAT/d	300 baud	None	IA-5						
Seoul/RKSS	S	SAT/d	9600 bps	X.25	IA-5						

Table CNS-1A AFTN PLAN

State/Station	Cat.	CURRENT				PLANNED				Target date of implementation	Remarks
		Type	Signalling Speed	Protocol	Code	Type	Signalling Speed	Protocol	Code		
1	2	3	4	5	6	7	8	9	10	11	12
Tokyo/RJAA	M	LDD/d	9600 bps	X.25	IA-5						
Ulaan Baatar/ZMUB	S	SAT/d	300 baud	None	IA-5						Note 2
Yangon/VYY\	S	SAT/d	300 baud	None	IA-5						
GUANGZHOU-M/ZGGG											
Beijing/ZBBB	M	LDD/d	9600 bps	X.25	IA-5						
Hanoi/VVNB	S	SAT/d	2400 bps	None	IA-5						
Hong Kong/VHHH	M	LDD/d	2400 bps	None	IA-5						Note 1
Macau/VMMC	S	LDD/d	2400 bps	None	IA-5						
Sanya/ZJSY	S	LDD/d	2400 bps	None	IA-5						
SANYA-S/ZJSY											
Guangzhou/ZGGG	S	LDD/d	2400 bps	None	IA-5						
Hong Kong/VHHH	S	LDD/d	2400 bps	None	IA-5						
TAIBEI - S/RCTP											
Hong Kong/VHHH	S	LDD/d	4800 bps	X.25	IA-5						
Manila/RPLL	S	LDD/d	300 bps	None	ITA-2						Note 1, 2
Naha/ROAH	S	LDD/d	4800 bps	X.25	IA-5						
HONG KONG, CHINA											
HONG KONG-M/VHHH											
Bangkok/VTBB	M	LDD/d	9600 bps	X.25	IA-5						
Guangzhou/ZGGG	S	LDD/d	2400 bps	None	IA-5						Note 1
Ho-Chi-Minh/VVTS	S	SAT/d	2400 bps	None	IA-5						
Macau/VMMC	S	LDD/d	2400 bps	None	IA-5						
Manila/RPLL	S	LDD/d	300 baud	None	ITA-2						
Sanya/ZJSY	S	LDD/d	2400 bps	None	IA-5						Note 1
Taibei/RCTP	S	LDD/d	4800 bps	X.25	IA-5						
Tokyo/RJAA	M	LDD/d	9600 bps	X.25	IA-5						
MACAU, CHINA											
MACAU - S/VMMC											
Hong Kong/VHHH	S	LDD/d	2400 bps	None	IA-5						
Guangzhou/ZGGG	S	LDD/d	2400 bps	None	IA-5						
COOK ISLAND											
RAROTONGA-S/NCRG											
Christchurch/NZCH	S	LDD/d	2400 bps	None	IA-5						
DPR KOREA											
PYONGYANG-S/ZKKK											
Beijing/ZBBB	S	SAT/d	300 baud	None	IA-5						

State/Station	Cat.	CURRENT				PLANNED				Target date of implemen-tation	Remarks
		Type	Signalling Speed	Protocol	Code	Type	Signalling Speed	Protocol	Code		
1	2	3	4	5	6	7	8	9	10	11	12
FIJI											
NADI - M/NFFN											
Brisbane/YBBB	M	LDD/d	2400 bps	X.25	IA-5						Note 2
Christchurch/NZCH	S	LDD/d	2400 bps	X.25	IA-5						Note 2
Funafuti/NGFU	S					LDD/d	2400 bps	None	IA-5	12/05	Dial-up
Noumea/NWWW	S	LDD/d	2400 bps	X.25	IA-5						Note 2
Tarawa/NGTT	S	LDD/d	2400 bps	None	IA-5						
United States/KSLC	M	SAT/d	2400 bps	X.25	IA-5						Note 2
Wallis Is./NLWW	S					LDD/a	2400 bps	None	IA-5	when traffic justifies	Current routing via Noumea
FRENCH POLYNESIA (FRANCE)											
PAPEETE/NTAA											
Christchurch/NZCH	S	LDD/d	2400 bps	X.24	IA-5						
INDIA											
MUMBAI - M/VABB											
Bangkok/VTBB	M	LDD/d	2400 bps	X.25	IA-5						
Kolkata/VECC	S	LDD/d	9600 bps	X.25	IA-5						
Colombo/VCCC	M	LDD/d	64 Kbps	X.25	IA-5						
Karachi/OPKC	M	SAT/d	2400 bps	None	IA-5						Note 2
Kathmandu/VNKT	S	SAT/a	50 baud	None	ITA-2						
Muscat Seeb/OOMS	M	SAT/a	300 baud	None	ITA-2						Note 2
Nairobi/HKNC	M	SAT/a	50 baud	None	ITA-2						
Paro/VQPR	S	SAT/a	300 baud	None	ITA-2						Dial-up, Trial operatior
KOLKATA - S/VECC											
Dhaka/VGZR	S	LDD/d	64 Kbps	X.25	IA-5						
Mumbai/VABB	S	LDD/d	9600 bps	X.25	IA-5						
DELHI - S/VIDD											
Tashkent/UTTT	S	SAT/a	50 baud	None	ITA-2						
CHENNAI - S/VOMM											
Kuala Lumpur/WMKK	S	LDD/d	9600 bps	X.25	IA-5						Note 1, 2
INDONESIA											
JAKARTA - S/WIII											
Brisbane/YBBB	S	SAT/d	9600 bps	X.25	IA-5						Note1,2
Singapore/WSSS	S	SAT/d	2400 bps	X.25	IA-5						Note 2

Table CNS-1A AFTN PLAN

State/Station	Cat.	CURRENT				PLANNED				Target date of implementation	Remarks
		Type	Signalling Speed	Protocol	Code	Type	Signalling Speed	Protocol	Code		
1	2	3	4	5	6	7	8	9	10	11	12
JAPAN											
TOKYO - M/RJAA											
Beijing/ZBBB	M	LDD/d	9600 bps	X.25	IA-5						
Hong Kong/VHHH	M	LDD/d	9600 bps	X.25	IA-5						
Russian Federation/UHHH	M	LTT	2400 bps	None	IA-5						(Khabarovsk)
Russian Federation/UUUU	M	LTT	200 baud	None	IA-5	LDD	2400 bps	None	IA-5		Coordination with Russian Federation in progress
Naha/ROAH	S	LDD/d	9600 bps	X.25	IA-5						
Seoul/RKSS	S	LDD/d	9600 bps	X.25	IA-5						Note 2
Singapore/WSSS	M	LDD/d	9600 bps	X.25	IA-5						
United States/KSLC	M	LDD/d	9600 bps	X.25	IA-5						
NAHA - S/ROAH											
Taibei/RCTP	S	LDD/d	4800 bps	X.25	IA-5						
Tokyo/RJAA	S	LDD/d	9600 bps	X.25	IA-5						
KIRIBATI											
TARAWA - S/NGTT											
Nadi/NFFN	S	LDD/d	2400 bps	None	IA-5						
LAO PDR											
VIENTIANE - S/VLVT											
Bangkok/VTBB	S	SAT/d	300 baud	COP-B	IA-5						Note 2
Hanoi/VVNB	S	SAT/d	9600 bps	None	IA-5						
MALAYSIA											
KUALA LUMPUR-S/WMKK											
Bangkok/VTBB	S	SAT/d	2400 bps	X.25	IA-5						Note 1, 2
Brunei/WBSB	S	LTT	2400 bps	None	ITA-2	LDD/d	9600 bps	X.25	IA-5	12/05	Note 1, 2
Chennai/VOMM	S	LDD/d	9600 bps	X.25	IA-5						Note 1, 2
Singapore/WSSS	S	SAT/d	1200 bps	X.25	IA-5						Note 2
MALDIVES											
MALE - S/VRMM											
Colombo/VCCC	S	LTT	50 baud	None	ITA-2	SAT/d	9600 bps	X.25	IA-5	12/04	Note 2
MARSHALL ISLAND											
MAJURO - S/PKMJ											
United States/KSLC	S	SAT/d	1200 bps	X.25	IA-5						

State/Station	Cat.	CURRENT				PLANNED				Target date of implementation	Remarks
		Type	Signalling Speed	Protocol	Code	Type	Signalling Speed	Protocol	Code		
1	2	3	4	5	6	7	8	9	10	11	12
MICRONESIA FEDERATED STATE OF											
CHUUK - S/PTKK											
United States/KSLC	S	SAT/a	1200 bps	X.25	IA-5						
KOSRAE - S/PTSA											
United States/KSLC	S	SAT/a	1200 bps	X.25	IA-5						
PONAPEI - S/PTPN											
United States/KSLC	S	SAT/a	1200 bps	X.25	IA-5						
YAP - S/PTYA											
United States/KSLC	S	SAT/a	1200 bps	X.25	IA-5						
MONGOLIA											
ULAANBAATAR-S/ZMUB											
Beijing/ZBBB	S	SAT/d	300 baud	None	IA-5						Note 2
Russian Federation/UII	S	LTT	50 baud	None	ITA-2						(Irkutsk)
MYANMAR											
YANGON - S/VYYY											
Bangkok/VTBB	S	SAT/d	300 baud	COP-B	IA-5						Note 2
Beijing/ZBBB	S	SAT/d	300 baud	None	IA-5						Note 1,2
NAURU											
NAURU - S/ANAU											
Brisbane/YBBB	S					SAT/d	2400 bps	X.25	IA-5		Internet as interium measur
NEPAL											
KATHMANDU - S/VNKT											
Beijing/ZBBB	S	SAT/d	300 baud	None	IA-5						
Mumbai/VABB	S	SAT/a	50 baud	None	ITA-2						
NEW CALEDONIA (FRANCE)											
NOUMEA - S/NWWW											
Nadi/NFFN	S	LDD/d	2400 bps	X.25	IA-5						Note 2

State/Station	Cat.	CURRENT				PLANNED				Target date of implementation	Remarks
		Type	Signalling Speed	Protocol	Code	Type	Signalling Speed	Protocol	Code		
1	2	3	4	5	6	7	8	9	10	11	12
NEW ZEALAND											
CHRISTCHURCH-T/NZCH											
Faleolo/NSFA	S	LDD/d	2400	X.25	IA-5						
Brisbane/YBBB	T	LDD/d	2400 bps	X.25	IA-5						Note 2
Nadi/NFFN	S	LDD/d	2400 bps	X.25	IA-5						Note 1, 2
Niue/NIUE	S										Currently by FAX
Papeete/NTAA	S	SAT/d	2400 bps	X.25	IA-5						
Rarotonga/NCRG	S	LDD/d	2400 bps	None	IA-5						
Tongatapu/NFTF	S	LDD/d	2400 bps	None	IA-5						
USA/KSLC	S	LDD/d	9600 bps	X.25	IA-5						
NIUE IS											
NIUE - S/NIUE											
Christchurch/NZCH	S										Currently by FAX
PAKISTAN											
KARACHI - M/OPKC											
Beijing/ZBBB	M	LTT	50 baud	None	ITA-2	LDD/a	64Kbps	None	IA-5	12/04	
Mumbai/VABB	M	SAT/d	2400 bps	None	IA-5						Note 2
Kabul/OAKB	S	SAT/d	300 baud	None	IA-5						Note 2
Kuwait/OKBK	M	SAT/a	50 baud	None	ITA-2						
PALAU											
KOROR - S/PTRO											
United States/KSLC	S	SAT/d	1200 bps	X.25	IA-5						
PAPUA NEW GUINEA											
PORT MORESBY-S/AYPM											
Brisbane/YBBB	S	SAT/d	9600 bps	X.25	IA-5						Note 2
PHILIPPINES											
MANILA - S/RPLL											
Hong Kong/VHHH	S	LDD/d	300 baud	None	ITA-2						Note 2
Singapore/WSSS	S	LDD/d	300 baud	None	ITA-2				IA-5		Note 1, 2
Taibei/RCTP	S	LTT	75 baud	None	ITA-2	LDD/d	300 baud	None	IA-5		Note 1, 2
REPUBLIC OF KOREA											
SEOUL - S/RKSS											
Beijing/ZBBB	S	SAT/d	9600 bps	X.25	IA-5						
Tokyo/RJAA	S	LDD/d	9600 bps	X.25	IA-5						Note 2
SAMOA											
FALEOLO - S/NSFA											
Chistchurch/NZCH	S	LDD/d	2400 bps	X.25	IA-5						

Table CNS-1A AFTN PLAN

State/Station	Cat.	CURRENT				PLANNED				Target date of implementation	Remarks
		Type	Signalling Speed	Protocol	Code	Type	Signalling Speed	Protocol	Code		
1	2	3	4	5	6	7	8	9	10	11	12
SINGAPORE											
SINGAPORE-M/WSSS											
Bahrain/OBBI	M	LTT	200 baud	None	ITA-2	SAT/a	2400 bps	None	IA-5	06/04	
Bangkok/VTBB	M	LDD/d	2400 bps	X.25	IA-5						Note 2
Brisbane/YBBE	M	LDD/d	2400 bps	X.25	IA-5						
Brunei/WBSB	S	LDD/d	4800 bps	X.25	IA-5						
Colombo/VCCC	M	LDD/d	9600 bps	X.25	IA-5						
Ho-Chi-Minh/VVTS	S	SAT/a	300 baud	None	IA-5						
Jakarta/WIII	S	SAT/d	2400 bps	X.25	IA-5						Note 2
Kuala Lumpur/WMKK	S	SAT/d	1200 bps	X.25	IA-5						Note 1,2
London/EGGC	M	LDD/d	1200 bps	X.25	IA-5						
Manila/RPLL	S	LDD/d	300 baud	None	ITA-2				IA-5		
Tokyo/RJAA	M	LDD/d	9600 bps	X.25	IA-5						
SOLOMON IS.											
HONIARA - S/AGGG											
Brisbane/YBBE	S					LTT	75 baud	None	IA-5		Internet as intermedium measur
SRI LANKA											
COLOMBO - M/VCCC											
Mumbai/VABB	M	LDD/d	64 kbps	X.25	IA-5						
Male/VRMM	S	LTT	50 baud	None	ITA-2	SAT/d	9600 bps	X.25	IA-5	12/04	Note2
Singapore/WSSS	M	LDD/d	9600 bps	X.25	IA-5						
THAILAND											
BANGKOK - M/VTBB											
Mumbai/VABB	M	LDD/d	2400 bps	X.25	IA-5						
Dhaka/VGZR	S	SAT/d	300 baud	None	IA-5						
Ho-Chi-Minh/VVTS	S	SAT/d	2400 bps	None	IA-5						
Hong Kong/VHHH	M	LDD/d	9600 bps	X.25	IA-5						
Kuala Lumpur/WMKK	S	SAT/d	2400 bps	X.25	IA-5						Note 1, 2
Phnom Penh/VDPP	S	SAT/d	300 baud	None	IA-5						Note 2
Rome/LII	M	LDD/d	2400 bps	X.25	IA-5						
Singapore/WSSS	M	LDD/d	2400 bps	X.25	IA-5						Note 2
Vientiane/VLVT	S	SAT/d	300 baud	COP-B	IA-5						
Yangon/VYYY	S	SAT/d	300 baud	COP-B	IA-5						Note 2
TONGA											
TONGATAPU - S/NFTF	S										
Cristchurch/NZCH		LDD/d	2400 bps	None	IA-5						
TUVALU											
FUNAFUTI - S/NGFU											
Nadi/NFFN	S					LDD/d	2400 bps	None	IA-5	12/05	Dial-up

State/Station	Cat.	CURRENT				PLANNED				Target date of implemen-tation	Remarks
		Type	Signalling Speed	Protocol	Code	Type	Signalling Speed	Protocol	Code		
1	2	3	4	5	6	7	8	9	10	11	12
UNITED STATES											
USA-M/KSLC											
Brisbane/YBBB	M	SAT/d	2400 bps	X.25	IA-5						
Christchurch	S	LDD/d	9600 bps	X.25	IA-5						
Chuuk/PTKK	S	SAT/d	1200 bps	X.25	IA-5						
Koror/PTRO	S	SAT/d	1200 bps	X.25	IA-5						
Kosrae/PTSA	S	SAT/d	1200 bps	X.25	IA-5						
Majuro/PKMJ	S	SAT/d	1200 bps	X.25	IA-5						
Nadi/NFFN	M	SAT/d	2400 bps	X.25	IA-5						
Pago Pago/NSTU	S	SAT/d	2400 bps	X.25	IA-5						
Ponapei/PTPN	S	SAT/a	1200 bps	X.25	IA-5						
Tokyo/RJAA	M	LDD/d	9600 bps	X.25	IA-5						
Yap/PTYA	S	SAT/d	1200 bps	X.25	IA-5						
VANUATU											
PORT VILA - S/NVVV											
Brisbane/YBBB	S	LTT	300 baud	None	ITA-2						Internet as interim measure
VIET NAM											
HANOI-S/VVNB											
Vientiane/VLVT	S	SAT/d	9600 bps	None	IA-5						
Ho-Chi-Minh/VVTS	S	SAT/d	9600 bps	None	IA-5						
Guangzhou/ZGGG	S	SAT/d	2400 bps	None	IA-5						
HO-CHI-MINH - S/VVTS											
Bangkok/VTBB	S	SAT/d	2400 bps	None	IA-5						
Hanoi/VVNB		SAT/d	9600 bps	None	IA-5						
Hong Kong/VHHH	S	SAT/d	2400 bps	None	IA-5						
Singapore/WSSS	S	SAT/a	300 baud	None	IA-5						
WALLIS IS. (FRANCE)											
WALLIS - S/NLWW											
Nadi/NFFN	S					LDD/A	2400 bps	None	IA-5		Current routing via Noumea Circuit will be implemented when traffic justifies.

Appendix I to the Report

TITLE AND TERMS OF REFERENCE

TITLE: ATN Transition Task Force

TERMS OF REFERENCE:

Plan for implementation of the Aeronautical Telecommunication Network (ATN) in the ASIA/PAC region to meet performance and capacity requirements of CNS/ATM Systems. The planning also addresses the ongoing development of the AFS including digital speech communication.

Subject/Tasks List of the ATN Transition Task Force

No.	Ref.	Task	Priority	Action Proposed/In Progress	Target
1	RAN/3 C 10/12 C 10/11d	Subject: ATN Transition Guidance Material. Task: Develop Regional ATN Transition Guidance Material.		1) Development of detailed guidance material.	Completed
2	RAN/3 C 10/11d	Subject: ATN Transition Plan Task: Develop an ATN Transition Plan to provide seamless transition to ATN.		1) Develop Ground Transition Plan taking into account Air-to-Ground aspects. 2) Develop a set of planning documents covering: i) ATN Regional Routing Architecture ii) ATN Naming and Addressing Conventions, and iii) Documentation of the Assigned ATN Names and Addresses.	Completed
3		Subject: ATN major elements. Task: Provide performance and functional requirements of ATN.	A	1) Develop ATN Technical Documents. ~~- Security~~ System integrity - Performance - System Management	~~2004~~ (2005 Monitor development in ACP) ~~2004~~ 2005 ~~2004~~ Completed
4	RAN/3 C 10/11b	Subject: AFTN related issues Task: Review operation of AFTN.	B	1) Evaluate and review the effect of increases or decreases in capacity and network changes, on circuit loading. 2) Plan network changes for support of OPMET and AIS databases, automated VOLMET broadcast.	On-going Completed

No.	Ref.	Task	Priority	Action Proposed/In Progress	Target
5		Subject: Planning and implementation information in ANP. Task: Develop G/G part of the CNS FASID.	A	Development of detail description for the existing tables and Charts for the G/G part of the CNS FASID.	
				1) Table CNS 1B – ATN Router Plan 2) Table CNS 1C – ATS MHS 3) Table CNS 1D – AIDC Routing Plan	Completed ~~2004~~ Completed 2005
6		Subject: ATN Documentation Task: Development of ATN Routing Documentations and ICDs.	A	Development of ATN Documents: 1) A Router ICD 2) A Routing policy for IDRP 3) A Routing policy for MTA 4) Directory of Service 5) An AMHS ICD 6) An AIDC ICD	 Completed Completed ~~2004~~ 2005 ~~2004~~ 2005 Completed ~~2004~~ 2005
7		Subject: Use of the public Internet Task: Develop guidance material for the use of the public internet technology to support AFTN, where required.	A	Study the possibility of using the public Internet and develop guidance material for its use to support low speed AFTN stations, as an interim measure, with particular emphasis on security and reliability.	Completed
8		Subject: Use of IP Task: Develop guidance material for the use of IP as a Sub-Network for ATN	B	In accordance with the work being performed by ACP, develop guidance material for the support of IP as a Sub-Network of the ATN, with particular emphasis on system compatibility between adjacent centers and security.	(2005 Monitor development in ACP)

No.	Ref.	Task	Priority	Action Proposed/In Progress	Target
9		Subject: AMHS Naming Registration Task: Develop registration forms for assigning AMHS address for the region	A	To develop an AMHS Naming Registration Planning Document for registering the AMHS naming conventions and assignments to be used within the region. To develop procedures for completing the Form.	~~2004~~ Completed 2005
10		Subject: AFTN/AMHS Transitional/Operational Procedures Tasks: Revise and develop transitional/operational procedures applicable to the use of the AMHS.	A	To review existing AFTN transitional/operational procedures and develop a new transitional and operational procedures applicable to the operation and use of the AMHS.	~~2004~~ (2005 Monitor development in ACP)

Sixth Meeting of Aeronautical Telecommunication Network (ATN)
Transition Task Force of APANPIRG
Bali, Indonesia 26 - 30 April 2004

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International Civil Aviation Organization and the Directorate General of Air Communication, Indonesia

SIXTH MEETING OF AERONAUTICAL TELECOMMUNICATION NETWORK (ATN) TRANSITION TASK FORCE OF APANPIRG

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1	-	Meeting Bulletin	Secretariat
2	5	Proposal amendment of the CNS Part of the EUR ANP Basic and FASID	HCAA
3	1	Report on APANPIRG ATNTTF Working Group	Rapporteur
4	1	Report on ACP WGN/02 Meeting Sub-group SGN/01 and SGN/02 Activities	Rapporteur
5	6	Status of Japan's ATN Implementation	Japan
6	7	Upgrading Tokyo/Moscow AFTN Circuit	Japan
7	3	Review AMHS Activities	HCAA
8	3	Summary of States Responses Concerning AMHS MD registration	Japan
9	7	Location Indicator for New Circuits	Indonesia
10	7	AFTN Circuit Statistics of Jakarta Communication Center	Indonesia
11	1	Report on ACP WGN/02 Meeting Sub-Group SGN/03	ATNTTF Working Group
12	1	Report on Activities of ACP Working Group N (Networking) – 2nd Meeting	USA
13	7	ATN Study in Mongolia	Mongolia
14	6	Summary of First Trials	AVITECH
15	5	Information for AIDC Transition	Japan

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1	-	Provisional agenda	Secretariat
2	7	Review Status of Implementation of the ASIA/PAC AFTN Plan Table CNS-1A	Secretariat
3	5	Review of Table CNS-1B and Chart CNS-2 of ASIA/PAC FASID	Secretariat
4	3	Review of CNS-1C Table Structure	Rapporteur
5	2	Review of X.25 Study for the ASIA/PAC region	Rapporteur
6	2	Review of the ASIA/PAC ATN IDRP routing policy	Japan
7	4	ASIA/PAC ATN Performance Document	Japan
8	5	Proposed Changes on FASID Table CNS-1D AIDC Implementation Plan	Thailand
9	4	Status of the Production of ASIA/PAC regional ICD for AIDC	Thailand
10	3	MTA Transitional Routing Policy	Japan
11	4	Sample System Integrity Authorization	Vic Patel USA
12	4	System Integrity Verification Checklist	Vic Patel USA
13	4	Proposed Changes to ATNTTF Documentation Tree	Vic Patel & T. McParland USA
14	2	ISO 8208 (X.25) Protocol Requirements List (PRL)	Vic Patel & T. McParland USA
15	3	AMHS Routing Impact	Hong Kong, China

WP No.	Agenda Item	Subject	Presented by
16	3	ASIA/PAC Regional Aeronautical Telecommunication Network (ATN) Air Traffic (ATS) Message Handling Service (AMHS) Description	Henry Lam USA
17	2	ASIA/PAC Regional Aeronautical Telecommunication Network Ground-Ground Router Description	Henry Lam USA
18	8	Terms of Reference (TOR) and Subject/Tasks List of the ATN Transition Task Force	Secretariat
19	2	ASIA/PAC ATN IDRP Routing Policy Version 2.0	T. McParland USA
20	7	Calculation of AFTN Circuit Loading Statistics for the International Circuits Operating on X.25 Protocol	Sri Lanka
21	4	Fourth Draft Asia/Pacific Technical Document on Use of Directory Services	Thailand and USA
22	3	Proposed Final Draft of ASIA/PACIFIC Regional ATN AMHS Naming Registration	Australia
23	4	Draft Asia/Pacific Regional ATN Administrative System Management Transition Guideline	USA
24	3	Routing Impact Study of Proposed AMHS Routing and ATN Link	Japan
25	4	Initial Draft Aeronautical Telecommunications Network System Management Policy	USA